Food Industry Library

MAY 1940

FOOD INDUSTRIES

OMES OF FAMOUS FOODS...SCHRAFFT'S CHOCOLATES, BOSTON, MASS.

IN THIS ISSUE:

What To Know About Colors for Foods

Electrocuting the Weevils in Cereal Products

Food Exhibits at the 1940 World's Fair

How To Prevent Browning of Frozen Peaches

What the Organized Consumers Are Doing

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FOOD INDUSTRIES

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★HOMES OF FAMOUS FOODS

Few foods stand out more in the public mind as a quality product than Schrafft's chocolates. The plant in which this famous food is made is shown on the cover. It is operated by W. F. Schrafft & Sons Corp., Boston, Mass.

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In THIS *Issue*

• ABOUT PEACHES BROWNING

The browning of peaches has kept a popular fruit from its rightful place as a leader among quick frozen foods. Browning can be prevented, however, by a rather simple method. Dr. J. G. Woodroof, food technologist of the Georgia Experiment Station, tells how to preserve "that school girl complexion" for the frozen sliced peach. Page 35.

• FOOD TO STEAL SHOW

New York World's Fair 1940 doesn't open until May 11. But you can get a literary look at the food manufacturers' exhibits in an article starting on page 42. All food companies will profit from the public relations jobs done at the Fair. But the competitors of the exhibitors will have to anticipate the effects of the promotion on Flushing Meadows.

• A CONSUMER CRUSADE?

Lochinvaresses are beginning to come out of the kitchen to unhorse the supposed black knights of business. So it's time for business to throw the light of fact on these misunderstood knights and reveal them as the ethical entities that they are. This public relations problem is discussed by Mrs. Helen Slater, head of consumer relations for Francis H. Leggett & Co. Mrs. Slater tells what organized consumers are thinking and doing. And she advises food manufacturers what to do about it to avoid future trouble.

• DEAD BUGS KILL NO SALES

You can put cereal products on the market without treating them to kill insects and larvae, but you have to bear the expense of promoting a rapid turnover on dealers' shelves. Or, if you prefer, you can suffer the ill will of consumers who buy bugs in their breakfast food, and take it on the chin from dealers who get the consumer complaints. O'Brien Milling chose to treat its packaged products electrically and avoid the grief. Page 54.

• HOW TO USE COLOR

Bakers, candy makers, beverage bottlers, ice cream manufacturers and some other food processors have an important production problem in the use of certified colors. Uniform quality in their finished products depends upon accurate control of the coloring ingredients, involving the knowledge of several factors. Illumination is cast upon this subject in the article commencing on page 38. The author, Dr. W. H. Kretlow, writes from long experience.

In FORTHCOMING *Issues*

• PINEAPPLE BITES DOG

And there you have a story of progress in food technology. A large meat packer has put to work in his process an enzyme obtained from the pineapple industry. This enzyme literally bites the casings of frankfurters and other sausages to make them more tender. You will read about it in the June issue. The story will get down to bedrock in discussing the functions of enzymes in the food industries.

• HOW TO AVOID STRIKES

When Babe Ruth wanted to avoid a strike he kept his eye on the apple and swung his bat to the right spot at the right time. But to prevent strikes in industry you don't swing a club. You use a lot of good common sense. The "Do's and Don'ts of Bargaining with a Union" will be published in June.

• WEIGHING THE DIAMETER

It's a cinch to grade spherical objects for size. You just pass them over a sieve. But what about irregular shapes like that of an apple? Well, that little problem has been neatly solved by an ingenious, yet simple, machine that sorts objects rapidly and accurately by weight. Coming soon.

• ARE YOUR EARS RED?

Consumers have told FOOD INDUSTRIES some unexpected and thought provoking things about food manufacturers. So we decided that a thorough canvass of consumer opinion would be useful. Such a survey has been completed. What consumers think of food manufacturers will be told in June.

• COME TO CHICAGO

June 17, 18 and 19 will see the first meeting of the Institute of Food Technologists — Morrison Hotel, Chicago. Three days of earnest discussion by leading food scientists, technologists and engineers will make this debut of the new industry-wide food institute an event that shouldn't be missed. An added attraction will be the exhibit of food machinery, accessories and supplies. FOOD INDUSTRIES looks forward to seeing you and other friends at Booth 21. See the June issue for a program of the meeting.

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LAURENCE V. BURTON, Editor
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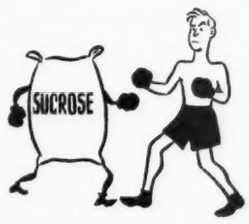
The Talk of the Industry

» THE OFFICIALS who erect the interstate Chinese trade walls certainly employ peculiar building materials. Consider, for instance, the case of the egg. Seven states define fresh eggs as eggs laid within the state. So, month old henfruit from local chickens is fresh, while day old eggs from across the state line are not fresh. There's something rotten here besides out-of-state eggs.

» SUCROSE vs. Secretary of Agriculture is the latest variant of the battle of sugars. This time it is to be a court trial that will be a honey. Sucrose interests will try to prove to the Circuit Court of Appeals that the Secretary of Agriculture didn't do right by them in announcing definitions and standards for canned fruits that permit dextrose to be used without a label declaration. But will it



not be delightful to see dextrose proponents backing up the Secretary?

» IN OUR continuing quest for better tasting foods, we have discovered canned Philadelphia scrapple made by F. G. Vogt & Sons, Inc.

Though scrapple itself dates back to pre-Revolutionary days, the current Vogt formula amply justifies our unstinted praise.

Another commendable feature is adequate directions for getting the product out of a cylindrical can in solid form for slicing.

» A WHITE HAIRED business man recently stepped up to us and began to comment on the business situation. With his views one could agree, provided one knew exactly how long the war would last.

"Do you want to *know* how long it will last?"

"Yes, but who does?"

"I do. The war will last for fourteen years," he replied with emphasis.

Well, there you have it. That would make it 1953 before peace comes.

» ANNOUNCEMENT of the very high vitamin content of ordinary grass at the spring meeting of American Chemical Society greatly stimulates one's thoughts.

It explains something that has perplexed this department for more than twenty years. During the World War we saw poor French peasants eating a meal of nothing but stewed grass whitened with a little milk. Was this really nutritious or was it merely something to distend the stomach and make the pangs of hunger less acute? Graham and his associates apparently have supplied an answer.

If the new announcement, showing that 12 lb. of grass contains more vitamins than a person would normally get in a year via fruits and vegetables, develops into a matter of notable commercial significance, one can foresee a new form of food processing in which

the lawn mower becomes an important integral part of the equipment needed.

» "MUCH of the pessimistic talk about the business outlook," says a Washington observer, "is being inspired by New Dealers in their effort to secure the largest possible appropriations for relief and other spending. After adjournment of Congress, attention will turn to the making of a good showing for the benefit of the election. Roseate reports as to business prospects are then expected to emanate from the same New Deal quarters."

Well, we shall see what we shall see.

» WE CAN SEE no reason for the excitement that periodically arises when someone plots the income of farmers and wages paid to workers. The two curves always travel up and down or horizontally together. How could it be otherwise until we shall again develop a huge export demand? If these two curves should ever deviate from close parallelism it would be good news indeed.

Robert Gordon Gould

With great regret we announce the first death of an "alumnus" of the editorial staff of Food Industries, Robert Gordon Gould. "Bob" Gould was the first member of the staff, joining up in July, 1928, as assistant editor, later becoming managing editor. From Food Industries he went to the Museum of Science and Industry as curator of Food Processing Exhibits. Later he was economic adviser to one of the code administrators in NRA days. To his family Food Industries extends sincerest sympathy.

Master Minds Are at Work

Hearings have been indefinitely postponed on the proposed rules covering label statements on vitamin, mineral and other dietary properties of foods. Nevertheless, great interest centered around the proposed rule that when claims are made for vitamin D to correct dietary deficiency, the label shall contain the statement that:

"When the skin is adequately exposed to direct sunshine, there is no established need for vitamin D in the diet."

"True, true," as Charlie McCarthy would say.

But, if this alternative principle is to be followed, why not require each baker to label his bread like this: "When you eat enough of something else, there is no established need for eating this bread. Save your money."

Or: "If you will drink adequate amounts of water, there is no established need for this beverage in your diet (coffee, tea, ginger ale, soda, beer, wine, etc.)."

As usual, the hotels in Washington continue to prosper.

Shrieks of Silence

No less than three different state officials have taken Food Industries to task for "errors" in the Digest of State Food Laws and Regulations which we published in Section 3 of the Food Industries Catalogs and Directory. It was pointed out to them that the Digests were literal quotations from the statutes of their own states and they were invited to inform us if the law had been changed unexpectedly. Up to now, no answer.

Food and Drug Shift Planned

Unless Congress objects within 60 days, or adjourns before June 11, the Food and Drug Administration will work under the Federal Security Administrator instead of the Secretary of Agriculture after about July first. This change is proposed in the President's fourth reorganization plan message to Congress, released on April 11. In the message, the President indicated that the purpose of the shift was to permit the F. & D. A. to develop along increasingly constructive lines, and to coordinate certain of its functions with those of the Public Health Service, recently moved from the Treasury Department to F.S.A.

What this shift may mean to food manufacturers is not yet fully apparent, but it is potentially of great importance. Few food authorities will question the move of drug and cosmetic control into closer association with the Public Health Service. That seems to be a logical step, from which much public good should result. But many have long questioned the combination of drug control and food regulation under one head. The two categories are unlike and the problems of control and regulation which they bring up are quite different, demanding diverse methods of approach and solution. Perhaps the mismated pair have been kept together because some food manufacturers have unwisely promoted their products as having curative value. In any case, the present reorganization offers an ideal opportunity to separate this mismatched pair. Food regulation might be left in the hands of the Department of Agriculture, presumably more sympathetic to the needs of food producers and processors, while drug regulation would go where it could benefit from specialized medical knowledge.

In contrast to this point of view, some look forward to the reorganization as an opportunity to speed up the slow procedure by means of which food standards are now fixed and litigation handled. Both of these jobs have been under the Solicitor of the Department of Agriculture. Under new auspices, there need be no sacrifice of thoroughness or any bypassing of legal requirements. But greater speed would give the public more prompt protection and would reduce the mental anguish now suffered by

Hors d'Oeuvres

• Methods of making textiles from soybeans and from whale fat have been developed by the Japanese. Apparently the Japs are as adept at making whole cloth as they are at making international excuses from it.

• *Whether food manufacturers like it or not, American women are getting thinner. They are on the average 3 to 5 lb. lighter than ten years ago, it is said. Yes, life gets more interesting all the time.*

• At a recent dinner of the Society of Amateur Chefs was served "Tender Frankfurts Calliope", concocted by Montgomery Flagg, the artist. Mr. Flagg got his name for the dish from the fact that "the sauce tastes like a calliope sounds." We haven't eaten it, but if the description fits it must leave one's tongue in a terrible dither.

• *Ever since we were a small potato we have considered "pop" as something to soothe the sizzle in a parched throat. Now American Bottlers of Carbonated Beverages come out with a book of recipes that put carbonated beverage into salads, desserts, ice cubes, tomato juice, punch and what have you. It lends color, flavor and zest, they say. Sounds like a good idea, even if a new one.*

• There has been developed a chemically treated paper which changes from white to deep blue in color when the temperature rises above a certain point. They should make this into collars for executives who get hot under the neckband.

• *Borden reports a solution to the problem of stolen milk. The idea was conceived by the wife of the sheriff in Memphis. Taking her husband's handcuffs she snaps one bracelet to the grill on the porch. Then the milkman snaps the other bracelet around the bottle neck. What if the milkman caught his wrist by mistake?*

• A new type of skin lotion is being made from Alabama peanuts by Peanut Products Co. Which, we suppose, gives the gals a complexion what is the nuts.

• *Seafood is one of the most important items in all my reducing diets," says Miss Betty Dean, trainer of Hollywood and Broadway glamour girls. Oh, Yeah. Look what it does to a whale.*

• For three "Pard" dog food labels and two bits, Swift is selling a book "How to Own a Dog—and Like It." The dog food manufacturers would seem to have a market building idea which baby food manufacturers could borrow. Say, a book on "How to Own a ———." Woah, Nellie!

• *Health regulations for the District of Columbia require that farmers selling milk in the nation's capital use "one hemstitched towel per teat per milking," says Mrs. Beatrice B. Schalet, consumer spokeswoman. And, she charges, the heavy bovine laundry increases the price of milk. But Elsie is a lady!* F.K.L.

the food industries through long drawn out standards proceedings and needlessly detailed technicality.

Whether the shift is made in full or in part, no change is anticipated in either the scope or application of the law. Nor is any change expected in the able group of men who have served the Secretary of Agriculture in the F. & D. A. Their authority and their attitude toward food matters are known and respected by the food industries. They may look for the continued support of these industries, regardless of what governmental agency they may form a part.

Commendable Association Merger

If ever there was an industry that has needed a national unity, it is the brewing industry. And yet up until March of this year, it has been divided on a three-way basis, each group seemingly going its own way irrespective of the policies of the others. This lack of unity on a national scale would not be as detrimental to the future of an entire industry in any other food group, except possibly the makers of wine. Fortunately, times have changed.

Two of the groups have now merged into one, which is a very important forward step. In fact, it is a highly commendable step and, it is to be hoped, will be followed by another merger. For there are now two large associations in the field, American Brewery Industry, Inc., and United States Brewers Association. And neither of them can speak for the entire industry, though each is representative of a significant sector.

Regulatory and legislative problems confront brewers to a greater extent than any other food industry. The situation is so complex that you could not order the shipment of your favorite brand of beer as a gift to a friend in another state unless the brewer involved had a license and a permit to ship beer into that state. Otherwise, the shipment is liable to seizure and the brewer may get into trouble.

Operating under enormous difficulties, ridden almost to death by taxation and regulation, suspected, misunderstood, and only a fifth of the industry able to break even let alone make profits, the brewers of the nation must ultimately be united in a single organization. Yet it must be a truly organized industry, more than a mere name.

Leaders may bring about the final merger in the years to come, yet only wholehearted cooperation of individual members can create conditions that will bring success to the majority. The first big move in that direction has been taken. The next should follow within a reasonable time.

What Invasion of Denmark May Mean to U. S. Food Manufacturers

Deplorable and contemptible as the German invasion of Scandinavian countries may be, the impact of this event on the United States agriculture and food industries must not be overlooked. On another occasion German action has had marked repercussions in this country. Not so many years ago Iowa farmers rioted and blamed meat packers for the low prices received for their hogs and the inevitable farm foreclosures that followed.

The involved history leading up to that unhappy year appears about to be reversed, and though no one will exult over it, it is important to understand the basic factors.

If you keep your back issues of Food Industries, get out Vol. 1 and read on page 461 (July, 1929) "German Agricultural and Dairy Practice Deplorably Backward in Some Respects." That was a digest of a report by a commission of ten American dairy experts who went to Germany at the invitation of Die Disconto-Gesellschaft (equivalent to U. S. Federal Reserve Banks). This study was a part of a move on the part of Germany to balance its imports with exports. The American recommendations were largely adopted and soon dairy imports from Denmark were practically stopped by Government decree.

Denmark lost a billion mark market almost over night. But the Danes were resourceful and rapidly turned to hog raising on a larger scale, cultivated the nearby British market, and in about four years had captured it to an astonishing extent. It was the U. S. farmer and meat packer who suffered from German economic action. The decline of exports of cured meats to U. K. was terrifying. Some items fell off by more than 90 per cent in a single year.

Hog prices fell to almost nothing in Iowa. Farmers rioted. A county judge was strung up to a tree and almost hanged.

Whose fault? Certainly not the meat packers. But why pursue the idea backward any further? The future has problems worthy of all our acumen, for now that Denmark has become a German captive, it is unlikely that any more Danish food will go to Great Britain.

Danish exports to U. K. were about $86,000,000 during the first 6 months of 1939, most of which was food. Denmark has been supplying about half of Britain's bacon, and a quarter of its butter and eggs.

Who will supply Britain now? While it is too soon to make any definite predictions it appears that: first Canada will be called on, next, New Zealand and Australia, then Argentina and Uruguay, and lastly the United States.

Why South America? Well, don't forget that England owns big packing houses along the River Plate. The high cost of the dollar in terms of the pound Sterling will put the United States at the bottom of the list of probable suppliers. Against this, however, is the shipping problem. Hence it appears that American food manufacturers may yet supply substantial amounts to the Allies.

Our opinion is that the first noticeable effects to become visible in the United States will be exports of dressed hogs to Canada for curing there and reexport to U. K.

The old combination of forces that cost us our British market now seems to be reversing itself.

Taste, Sex and Age

Increasing stress on the importance of flavor control to food manufacturers raises questions as to whether or not standards of flavor can be set. Does the sense of taste function in nearly enough the same way among large numbers of consumers to permit this? Can a standard flavor be determined for a food which will meet the preferences of a majority of prospective consumers?

Some general facts about flavor preferences have been observed from time immemorial. For instance, children have little tolerance for sour or bitter flavors, but crave the sweet. Adults, up to middle age, tend to like all the basic flavors—sweet, salt, sour and bitter. In later life the liking for sweet flavors decreases, and preference for sour flavors increases. These are matters known to any housewife with a large family.

Few scientific data, however, have been available to serve as guides to the food manufacturer in his selection of flavors. What is perhaps a beginning of work along these lines is found in a series of tests carried out by Dr. Donald A. Laird of the Ayer Foundation for Consumer Analysis. His problem was to determine which of five flavors of pineapple juice, graded from sweet to sour, was preferred by consumers. In testing these juices, Doctor Laird determined the

effect of age, sex, use of tobacco and wearing of dentures.

As might be expected, with increasing age, preference shifted from the sweetest juice to those of sour flavor. Men and women, when young, both preferred the sweeter samples. In the age group from 50 to 68 years, while men showed increasing tolerance for the sour but still liked the sweet better, women showed a definite preference for the three juices that were the most acid. In the matter of tobacco smoking, no difference was noted except that it seemed to heighten the older women's preference for sour flavors. Wearing of dentures had no definite correlation with preference for sweet or sour.

While this experiment was, no doubt, helpful to the producer of pineapple juice, it is no more than a first step in determining flavor preferences. Taste is a complicated sense, concerned not only with the four basic flavors of sweet, salt, sour and bitter, but also with hundreds of modifying overtones of aroma and flavor. Whether taste preferences can ever be sufficiently well understood to enable the food manufacturer to predict results in advance is at least doubtful. But it is also certain that the more data becomes available on taste preferences the more accurate will flavor control become, with less dependence necessary on expensive "chefs" and doubtful methods of "cut and try." It is a line of research that should be pursued.

When You Are Developing Formulas

CONSIDERABLE misgivings and doubts assailed us when FOOD INDUSTRIES initiated the Formulas for Foods department in September, 1939. It seemed as if we were unlocking that box of troubles known to mythology as "Pandora's Box," and that our hands would be full from that day on. It may interest you to learn that we have not been disappointed in this prediction.

Many of the problems arising from this department seem to stem from the lack of knowledge of the principles of cooking by men who are engaged in the development of new formulas or new products. Accordingly, we urge everyone who comes in this category to buy and really study a volume know as "Experimental Cookery," by Belle Lowe, professor of foods and nutrition, Iowa State College. The book will cost you $4.50, and you buy it from John Wiley & Sons, New York, not from us. This volume was reviewed on page 681 in the November, 1937, issue of FOOD INDUSTRIES.

After consulting the book many times in the past three years, we have nothing but the highest praise for the excellent piece of work done by Miss Lowe. In fact, we have come to the conclusion that before anyone starts messing around, he would be making a very correct start by reading that book clear through.

For Better Tasting Foods

USUALLY it is unfair to lift one sentence out of the body of another's discussion for comment. Hence, if you doubt the implication of the following statement from Sir John Russell, of the famous old Agricultural Experiment Station at Rothamsted, England, see *Nature,* **145**, 11, 1940, where he says on page 12:

"The great difficulty about reducing our meat ration will be that we may be presented with a succession of vegetarian dishes, made dull and tasteless, not through any fault of the vegetables but *because of the incompetence of the cook.* (Our italics.)

"Food value is probably of less importance that tastiness; it seems improbable that our (British) dietary would ever be so seriously curtailed as to be lacking in actual food value; the present danger is that it may lack variety and no longer be appetising."

For years FOOD INDUSTRIES has preached that better tasting foods is the key to greater success of the food industry. It is gratifying to find so eminent a scientist as Sir John Russell coming out in favor of good tasting foods.

If there is any one aspect of food manufacture that deserves continuous research it is the problem of flavor improvement. The firm that has products of such flavor appeal that the public keeps coming back for more has a much easier path to success than a concern that has to employ reason to get the public to buy its products. If you doubt it, consider the case of Hershey Chocolate Co. Up to now Hershey has been able to get along without any consumer advertising.

Empty-tank Problems in Floods

THOUGH huge bulk storage tanks for gasoline are not matters of immediate concern for food manufacturers, they may develop into a potential hazard to a nearby food plant in times of floods. This additional high water problem comes about because these big tanks will often float and break loose from their foundations, causing the connecting pipe lines to break and permit the gasoline to spread over the flood waters. And nearly always the loosened gasoline ignites adding fire to water disaster.

A friend who is in charge of many such bulk stations informs us that in time of impending floods, his subordinates at these stations instinctively try to save the gasoline which is in their custody by shipping it away. Thus, the tanks are often left entirely empty, which, he says, is inviting disaster. The reason is that a full tank will not float, but an empty one can easily cause all manner of troubles as the waters rise. Of course, a heavy floating object such as a house might bump into a full tank and break it loose from its foundations and release its contents, but if the tank is empty or even only partially filled, the danger from high water is increased manyfold until the disaster is almost certain. Instructions have been issued to keep all tanks full at high water. And if gasoline is not available for this purpose, then the employees are instructed to run water into the tanks until they are filled, beginning with the tanks on the upstream side. Such instructions are, however, abhorrent to the average man and, under the excitement of imminent floods, the rules are frequently disobeyed.

Any one who has ever witnessed the havoc created by floods where big tanks are floated loose will well understand the reasons for the foregoing instructions. The only "catch" in them is the fact that it requires nearly an entire day to fill such a tank from a 4 in. water line with ordinary city pressure behind it. Which, in turn, means that either high water must be properly anticipated in February, March and April or that bigger pipe lines must be available.

Admittedly there is little that the food manufacturer can do about upstream storage tanks belonging to somebody else. Yet there are often opportunities to use moral influence or to encourage correct thinking on the part of one's neighbors. And then, too, food plants often have their own private empty tank problems in times of high water. An empty tubular boiler has been known to break loose and raise havoc. Also processing tanks. Empty carbon dioxide cylinders bumping around have often smashed up valuable equipment that would otherwise have been as good as ever after cleaning and oiling.

If your factory is in a flood area, the grief can be considerably lessened for everybody if all hollow vessels are full of water before the flood hits them, and you would do well to encourage others to fill their tanks.

Partial view of the set-up for testing the rate of browning of 41 varieties and approximately 1,000 samples of peaches. In the background are shown a few of the 124 solutions that were used.

How to Prevent

Browning of Peaches In the Freezing Industry

Part I

By J. G. WOODROOF
Food Technologist, Georgia Experiment Station Experiment, Ga.

PEACHES* have been preserved by freezing for the past nine years.† The tonnage being marketed in this manner has not kept pace with the increased tonnage of most other common fruits and vegetables being frozen. The tendency of peaches to turn brown, by the action of oxidase enzymes on catechol-tannins, presents a problem as great as all other problems combined. Peaches are likely to turn brown: (*a*) before they are frozen, (*b*) while in freezing storage, or (*c*) while being thawed in preparation for serving. Lowering the temperature retards but does not prevent browning, and ice formation in the tissues greatly stimulates it. Thus peaches brown much worse at 26 deg. F., just below the freezing point, than at 29 deg. F. when no ice is formed.

Realizing the potentialities of frozen peaches to the ice cream, bakery, preserve, institutional and household trades, an effort has been made to study systematically the chief factors associated with browning of frozen peaches.

* Technical Paper No. 66 of the Georgia Experiment Station.
† This report is made possible through the cooperation of several commercial freezing plants operating in Georgia, the Department of Commerce of the Tennessee Valley Authority, and the Tennessee Engineering Experiment Station.

Effect of Freezing on Tendency to Brown

In the process of peeling, slicing and grading peaches, in preparation for freezing, browning is confined to the exposed surfaces. Faces of slices that lie flat on a belt or table do not turn brown, while all those that are exposed to air turn objectionably brown in about ten minutes. The specific location of browning is in the cells of, or adjacent to, the vascular strands. Superficially, the discoloration in both yellow and white flesh varieties appears as brown dots and streaks, as was shown by Drain[8] with apples, and is worse where the greatest number of strands are cut, as near the seed. It is only after many hours of exposure that browning penetrates below the surface cells, or beyond the cells that were ruptured in peeling or slicing. Thus, the solution of the problem of preventing browning in freshly sliced peaches in a freezing plant is to cover with water containing an anti-browning agent for about one minute, then remove and freeze as rapidly as possible.

Materials which have been reported to prevent browning of sliced apples and other fruits are: glutathione or cysteine salts[1]; 0.10 per cent thiourea or 20 per cent pineapple juice[7]; 5 per cent sodium chloride[14]; 30 per cent or higher sugar sirup; or acids such as 1 per cent sulphurous, 0.1 per cent hydrochloric, or 2 per cent citric; and heat to 180 deg. F. or higher.[16] There is a question on the part of the Food and Drug Administration with reference to the use of the first three of these materials for treating peaches for freezing; and sodium chloride cannot be used because of its effect on palatability. High concentrations of sugar sirup are objectionable for washing sliced peaches because of the high viscosity, as well as high cost. Sulphurous acid is a reducing agent and tends to destroy the yellow color in peaches, as well as to prevent browning.

THE most satisfactory means of preventing "surface browning" of sliced peaches commercially has been by dipping them in a solution of 2 per cent citric acid, or 0.1 per cent hydrochloric acid, for one minute. Replacement of the acid in the bath depends largely on how the peaches are peeled. For hand-peeled peaches, 1 oz. of hydrochloric acid for each 25 bu. of

peaches will be sufficient. Lye-peeled peaches will probably require more acid.

Peaches ground to a pulp before freezing, as for ice cream, turn brown throughout the mass within ten minutes, because the rupture of the majority of the cells permits contact with air. This can be overcome by mixing about 25 per cent sugar or one per cent thiourea[7] with the peaches in the pulper.

After peaches are frozen, browning is no longer confined to the surface. The protoplasm of the cells is precipitated, many cell walls are ruptured by ice crystals, and the permeability of the remaining cell walls is greatly increased.

The interior of a slice of frozen peach browns almost as rapidly as the surface, and is much more difficult to reach with anti-browning agents, as acids, thiourea, sugar and heat. However, indications are that the discoloration is initiated on the surface and penetrates at a rapid rate. This is true even at 0 deg. F. This "internal browning" is much worse than "surface browning" after it is once under way.

Experience has shown that, if the surface is entirely protected from air during and subsequent to freezing, no browning occurs. Sugar or sirup is probably most satisfactory for this, and Ferris and Taylor[9] have described a method of freezing individual slices of peaches in invert sugar sirup, cooled to 0 deg. F. The excess sirup is removed by centrifuge, leaving from 1 to 3 per cent of sugar on the slices in the form of a film or glaze. Three years of experimenting indicates that this method is particularly adapted to peaches because: (a) it freezes quickly (in five to seven minutes) and while the slices are protected from browning by sirup, (b) the finished pack contains such a small amount of sugar that for household or institutional purposes the peaches can be used as fresh peaches.

Omitting the use of anti-browning agents, three lots of peaches were frozen at widely different rates, and the rate of browning of the thawed product was studied. Worst browning occurred with peaches frozen very quickly in direct contact with dry ice. This, in spite of the fact that carbon dioxide gas displaces air about the peaches and supposedly reduces oxidation. The next worst browning was with those frozen in about fifteen minutes on a metal plate cooled to 0 deg. F. Sliced peaches packed in 1-lb. containers and frozen in about five hours at 0 deg., browned least of the three lots. However, the last had an unattractive, semi-cooked, translucent appearance which the other two did not have. These results are in general accord with those found by Culpepper *et al.*[6]

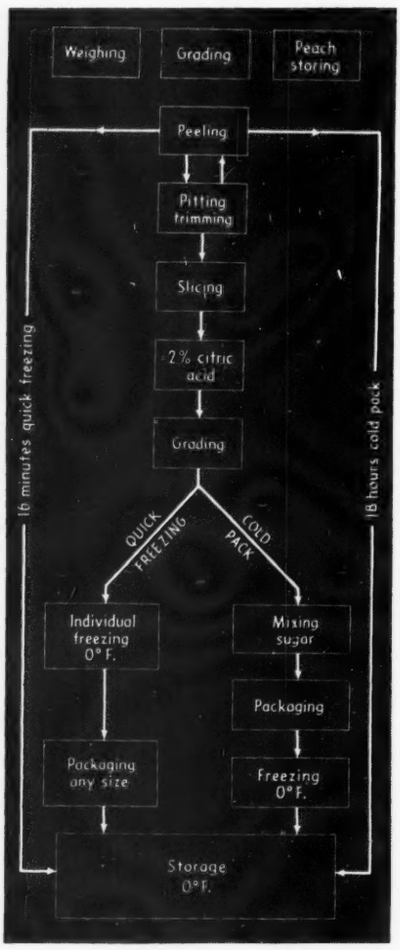
Table I — Showing Effect of Buffered Solutions of Varying pH on Yellow and Red Colors of Elberta Peaches, When Treated for Varying Lengths of Time.

pH of Solution	Yellow Color 30 min.	60 min.	90 min.	6 hr.	Red Color 30 min.	60 min.	90 min.	6 hr.
2.21	0	0	0	0	–	– –	– – –	– – – – –
3.09	0	0	0	++	–	– –	– –	– – – –
4.00	0	+	+	++++	0	–	–	– –
4.45	0	+	++	++++	0	0	b	– – – –
4.79	+	++	+++	+++++	b	bb	bb	– – – –
5.17	+	++	+++	++++++	b	bb	bbb	– – – – –
5.58	++	+++	++++	+++++++	bb	bbb	bbb	– – – – –
6.03	++	+++	++++	+++++++	bb	bbb	bbbb	– – – – –
6.25	++	+++	++++	++++++	bb	bbb	bbbb	– – – – –
6.65	++	+++	++++	++++++	bb	bbb	bbbb	– – – – –
7.03	++	+++	++++	++++++	bbb	bbbb	bbbbb	– – – – –
7.40	++	+++	++++	++++++	bbb	bbbb	bbbbb	– – – – –
8.13	++	+++	++++	++++++	bbb	bbbb	bbbbb	– – – – –

+ indicates browning. – indicates loss of color. 0 indicates no change. b indicates bluish-purple color.

Table II — Effect of Freezing on pH and Total Sugars in Peaches

Variety	Fresh (before freezing) pH	Sugars (per cent)	After thawing pH	Sugars (per cent)
Sunbeam.....	3.72	8.8	3.59	7.8
Fair's Beauty.	3.54	8.2	3.63	8.5
Pioneer.....	3.91	10.8	3.83	10.7
Average.....	3.72	9.3	3.68	9.0



A series of suggested steps to be followed in a peach freezing plant where sharp freezing and quick freezing by immersion are carried out.

Effect of Acidity on Browning

Browning of peeled peaches is arrested by slight acidity and is stopped by killing the enzymes with high acidity. Nightingale *et al*[13] found that developing fruits increased in acidity until the soft-ripe stage, when the percentage of acid suddenly decreased. Blake and Davidson[2] thought that l-malic and citric acids, which appear in almost equal portions, were important factors in controlling enzymatic reactions, permeability and turgidity of cells. Cruess *et al*[5] stated that oxidation (browning) is greatly lessened by lowering the pH, that is, increasing active acidity. They found that rinsing for one-half to two minutes in 0.5 per cent hydrochloric acid (after lye peeling) effectively prevented browning. Rinsing one-half to two minutes in 0.5 to 1 per cent citric acid also arrested browning. Woodroof[16] found that browning was arrested by rinsing thoroughly in 4 per cent phosphoric acid, 2 per cent citric acid, or 2 per cent sulphurous acid; while 1 per cent malic acid, 2 per cent tannic acid and 0.001 per cent acetic acid, did not prevent browning. Fong and Cruess[10] found that the temperature required to inactivate the peroxidase of peaches and other fruits varied with the pH. Resistance to heat was greatest at pH 5 to 7, decreasing with both increase and decrease in pH.

Bunzel[3] found that the inhibiting range of hydrogen-ion concentration

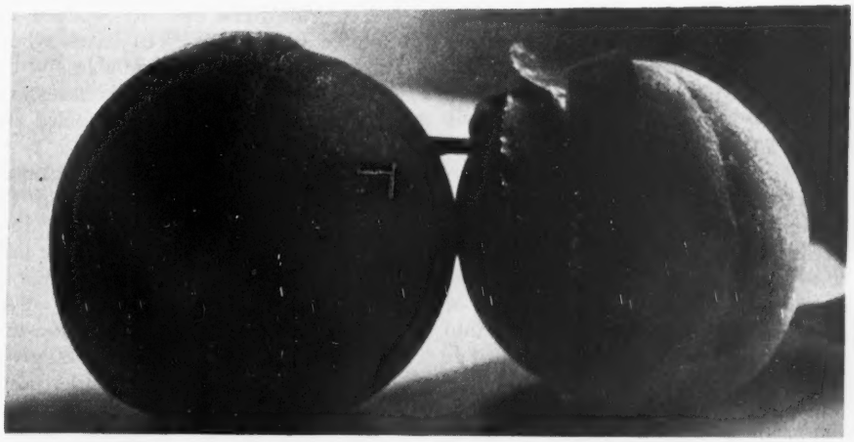
Sliced peaches ready for freezing. If frozen by immersion, each slice will be covered by a glaze of sugar sirup, which protects it from browning.

for oxidase activity in potato tubers was pH 3.55 to 3.70; in tulip buds and leaves it was pH 2.30 to 2.80; and for magnolia buds and leaves it was pH 2.45 to 3.05.

Twenty-five highly buffered, aqueous solutions, ranging in pH from 2.21 to 8.13, were used for treating slices of freshly peeled peaches, to determine the effect of acidity on browning (see Table I). The solutions were made up with hydrochloric acid and sodium hydroxide, using phthalate and hypophosphate as buffering agents. The slices were thoroughly wet with the solutions and remained almost submerged for 30, 60, 90 minutes and six hours, respectively, before records were made. As the red (anthocyan) color at the seed is desirable in frozen peaches, the effect of varying pH on this pigment was noted.

Among the 30 minute treatments, no browning occurred below pH 4.65; this was also the point at which the red color at the seed changed to blue. In 60 and 90 minute treatments, browning was observed as low as pH 4.0 and 3.47; otherwise they were similar to 30 minute treatments, except for being more intense. In two hour treatments, browning developed at a pH as low as 2.55 and increased to 5.58; at pH 6.25 and upwards browning was slightly reduced.

The red color was slightly dissolved in 30 minutes below pH 3.47; from pH 4.0 to 4.65 it was unchanged; and above this point it changed to blue, increasing in intensity to about pH 7.0, and remaining constant above this point. The blue color increased for 60 and 90 minutes, but was completely dissolved in two hours.



The J. H. Hale is recommended as the best all-round variety of peach for freezing, partly because of its high resistance to browning. It is the third most popular yellow-fleshed, midseason, freestone peach in the United States.

In an effort to determine what changes freezing produced in pH and total sugars in peach juice, and whether such changes had any influence on browning, the pH and total sugars of the juice of each of twelve individual peaches of three varieties (36 in all) were determined before and after freezing. The results are summarized in Table II.

It is concluded that one of the most practical ways of preventing browning of peaches while in preparation for freezing is to keep the individual slices of peaches wet with a solution with a pH of 3.47 or slightly lower. It appears that changes in pH and total sugars in peaches, due to the freezing process, are very slight and do not account for any increased browning of frozen peaches over fresh peaches.

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EDITOR'S NOTE—Part II of this article will be published in the June, 1940, number of "Food Industries."

What to Know About FOOD COLORS

Solubility at different temperatures, reactivity with solvents and container materials, and uniformity of coloring strength are as important factors in their use as in their certification

By W. H. KRETLOW
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"IF you treat the color right, it will treat you right" is a slogan to be kept well in mind when using certified food colors.

Many of the difficulties experienced from time to time by food processors and manufacturers in their use of colors are traced, upon investigation, to an improper treatment or application of the dye.

As a matter of convenience, certified food dyes are usually placed on the market in a powder form. While the powder form may be the most satisfactory one for marketing purposes, it has its disadvantages from a use viewpoint. Unless extreme care is used: (1) the amount of color put into successive batches will vary considerably, (2) the opportunity for contamination of contents of container is greatly increased by the frequency with which the container is opened for batch weighings, (3) likelihood of being carried by air currents into products other than those intended is great, (4) loss on account of spilling and careless handling is likely.

For these reasons, food dyes should be put into a solution or paste state according to the purpose for which they are intended before being used. Doing so involves a specific property of the dyes which too frequently is not taken into account by the user of food colors. Each dye has a definite solubility weight in various solvents and at different temperature levels.

Each certified food color is a definite chemical compound with properties of shade, fastness, solubility and behavior to reagents which depend largely upon the particular atomic groups of composition and their arrangement in the dye molecule. Because these atomic groupings are variable factors, the users of colors must bear in mind that no two dyes have the same solubility in any solvent at a given temperature. Knowledge of this fact is important to insure proper preparation of color solutions.

As a first recommendation in the preparation of color solutions, the use of distilled water is recommended in all cases where it is available. Distilled water will cause less trouble than will water from a natural source. Ordinary well or tap water contains considerable quantities of calcium and magnesium salts which are likely to react with some dyes to produce insoluble compounds. In cases where distilled water is not available and the use of ordinary tap water is necessary, the water should be boiled, cooled and filtered before using.

An example of the effect of temperature alone on the solubility of the thirteen water-soluble certified food colors is shown in Table I. The data in this chart represents the number of ounces of the water-soluble dyes which will remain in a gallon of a distilled water solution at the given temperatures. The temperatures range from freezing for the particular solution to 130 deg. F.

To assure full solubility of any of the thirteen dyes, the water must be heated to at least 50 deg. F. higher than that at which the solubility of the dye is determined. Light green S.F. Yellowish and Brilliant Blue F.C.F. are so extremely soluble that there is no point in attempting to get data for each individual temperature; the temperature at which the dye starts precipitating is doubtful.

The data given in the chart is important in that it emphasizes the need for keeping the color solutions at sufficiently high temperatures to prevent settling out between times of using and giving rise to variations in batch colorings. It must be taken into consideration when a blend of two or more dyes is being used; the less soluble dye may be forced from the solution with a resulting change in color.

This data is also important to the users of colors in the dry state. Since each dye has definite solubility limitations, some of it will not be dissolved in a batch if the mixing or stirring period is short or the amount used is in excess of its solubility at the temperature used or will be thrown out of solution upon cooling.

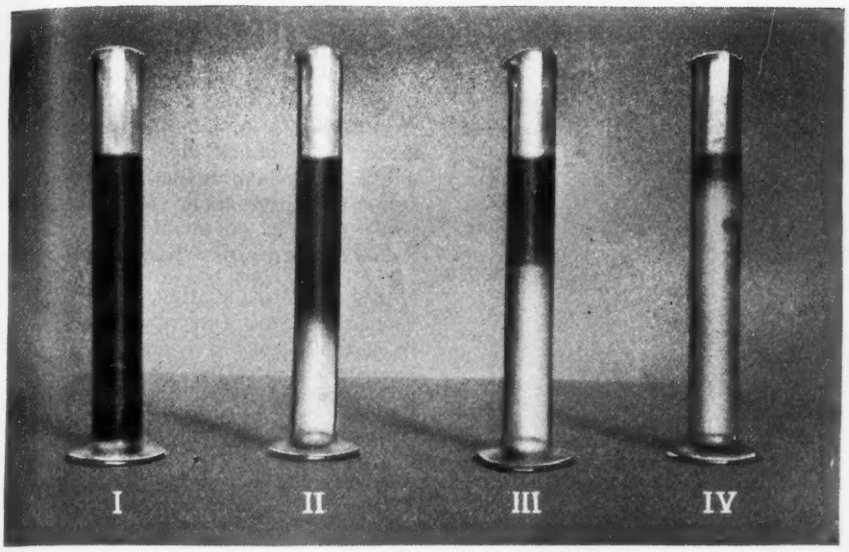
Failure to recognize these facts and to proceed accordingly may result in streaked or splotched color effects as well as in color variations from batch to batch.

Table I—Solubility Chart for Thirteen Water-Soluble Certified Food Colors

Dye Name		Ounces of dye in gallons of solution [1] at degrees Fahrenheit										
Official	Old	Freezing	40 deg.	50 deg.	60 deg.	70 deg.	80 deg.	90 deg.	100 deg.	110 deg.	120 deg.	130 deg.
Red No. 1	Ponceau 3R	6.2	10.9	13.6	15.1	16.7	17.9	19.1	20.3	21.5	22.5	22.8
Orange No. 1	Orange I	1.5	1.9	2.2	2.5	2.7	3.2	4.0	5.0	8.6	13.2	17.5
Yellow No. 5	Tartrazine	5.9	6.2	8.1	10.3	14.9	21.4	35.3	41.5	45.9	48.8	49.9
Red No. 2	Amaranth	3.1	12.1	17.7	20.9	22.9	26.0	28.2	30.4	31.9	33.6	35.3
Green No. 1	Guinea Green B	12.0	18.0	24.0	30.0	33.2	36.0	38.4	42.2	46.0	48.6	51.2
Green No. 3	Fast Green F.C.F.	12.0	18.0	24.0	30.0	33.2	36.0	38.4	42.2	46.0	48.6	51.2
Red No. 3	Erythrosine	5.0	6.2	7.4	8.6	10.0	11.4	12.8	14.4	16.0	17.6	19.3
Blue No. 2	Indigotine	0.8	0.9	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.8
Yellow No. 6	Sunset Yellow F.C.F.	9.2	23.0	28.0	30.9	33.7	35.6	37.4	39.2	40.9	42.6	43.8
Red No. 4	Ponceau SX	1.25	2.5	5.0	7.4	8.6	9.8	10.4	11.6	11.5	11.8	12.1
Yellow No. 1	Naphthol Yellow	10.9	12.1	13.2	14.3	16.0	17.7	20.3	23.0	26.0	29.5	32.8
Green No. 2	Light Green S.F. Yellowish	Very soluble. 25 per cent will remain in solution even at freezing.										
Blue No. 1	Brilliant Blue F.C.F.	Very soluble. 32 per cent will remain in solution even at freezing.										

[1] To dissolve the above colors, the solution must be heated at least 50 deg. F. higher than the chart indicates. Then cool to desired temperature.

[2] Federal Food, Drug and Cosmetic Administration.



Tartrazine (F.D.&C. Yellow No. 5) illustrates changes in solution color strength likely to take place with changes in temperature: I—dye all in solution at 130 deg. F.; II—heavy precipitate when cooled to 100 deg. F.; III—precipitate increased when cooled to 70 deg. F.; IV—dye almost completely out of solution at 35 deg. F.

Most of the blended dyes on the market are diluted with salt or sugar. This dilution is not to be considered as an adulteration or a falsification. Dilution is a necessary operation to obtain a consistent standard of strength. It also serves to simplify the use of colors without the addition of water. Dilution of colors in this way is a disadvantage when the colors are to be used to make a concentrated water solution; especially when salt is the diluent. The addition of salt to most solutions of water-soluble colors will cause a precipitation of the dye, if in sufficient concentration. Manufacturers of dyes make use of this fact to obtain dyes in crystalline form. Throwing down of dyes by salt is usually speeded up in the presence of an acid.

When sugar is used as a diluent, the color solution is likely to ferment and become moldy upon standing. Partial or complete loss of acid-fast colors in beverages may be traced to spoilage of the color solution because of long standing, or, more likely, to the effect of microbial contamination of the sirup. Often, cases of excessive foaming during the bottling of beverages is a result of deteriorated color solutions or sirup contamination. Because of the stated disadvantages, diluted dyes should not be used in the preparation of color solutions. Use of primary colors or of mixtures having high dye content is strongly recommended.

A freshly made color solution is likely to be nearly sterile, if properly prepared. To keep it so requires protection against contamination by yeast, molds and bacteria. The practice usually followed is to add alcohol, glycerine or sodium benzoate to the solutions as a preservative.

The addition of sodium benzoate has practically no effect upon the solubility of the food colors. Glycerine, although used in comparatively large quantities—usually 25 per cent by volume—does not function as part of the solvent for the dye. Alcohol, however, does have a decided effect upon the solubility of some of the dyes. When the customary 10 per cent by volume of alcohol is added, the solubility of those dyes is reduced by as much as 50 per cent. This reduction in solubility applies particularly to Amaranth, Ponceau 3R and Sunset Yellow. In Table II is listed the approximate solubility of ten primary certified food dyes in 10 per cent alcohol by volume at 70 deg. F.

Light is another factor to be reckoned with in the premanency of color solutions. Some of the food color dyes are extremely sensitive to violet rays. They will gradually lose their coloring power when exposed to light for any length of time. Indigotine is especially susceptible to change. Solutions containing it should not be stored for any length of time. Other colors effected by light are: Erythrosine, Guinea Green B and Light Green S. F. Yellowish. To be on the safe side, all color solutions can well be stored in amber colored bottles to exclude as much light as possible.

Table II—Solubility of Primary Food Colors in 10 Per Cent Alcohol at 70 Deg. F.

Red No. 2. (Amaranth)	12.8 oz. per gal.
Red No. 3. (Erythrosine)	10.0 oz. per gal.
Green No. 3. (Fast Green F.C.F.)	25.6 oz. per gal.
Green No. 1. (Guinea Green B)	25.6 oz. per gal.
Blue No. 2. (Indigotine)	1.0 oz. per gal.
Orange No. 1. (Orange I)	2.7 oz. per gal.
Red No. 1 (Ponceau 3R)	10.0 oz. per gal.
Red No. 4. (Ponceau SX)	6.0 oz. per gal.
Yellow No. 6 (Sunset Yellow)	20.0 oz. per gal.
Yellow No. 5. (Tartrazine)	12.8 oz. per gal.

Some metals have a decided reducing action on dyes, completely decolorizing them or changing their shades. For this reason, the vessels that come in contact with colors in solution should be selected with care. Glass containers or those equipped with glass linings are easy to keep in a sanitary condition and have no chemical action on the dye solution. Wood is non-reactive with dyes but it is difficult to keep clean. Among the metals, Monel and stainless steel will cause no reduction in the intensity of the color. Use of tin, iron and zinc is to be avoided.

Accurate weighing of the dye is an important operation in preparing color solutions. Factory errors in the weighing or measuring of dyes can be eliminated through the use of individual pre-weighed packages. These accurately weighed packages are now available on the market in fractional-ounce sizes. They aid in the preparation of color solutions and paste colors as a means of obtaining and maintaining uniformity in addition to being convenient. Variations in the density of color, even between batches of the same dye, make advisable the use of color by weight instead of by volume in the dry, and even in the paste, state.

WHEN paste colors are prepared, the same precautions apply as in the case of solutions. Unless the color used is actually dissolved, the paste becomes a mechanical mixture and the particles of color may not be uniformly distributed; an uneven shade results.

Paste colors are usually composed of a dye dissolved in a solution of water and glycerine with enough powdered sugar to give the desired consistency. To insure full solubility of the dye, the quantity used per batch should be relatively small—one or two ounces of dye per pound of paste usually serves the purpose.

Observance of the precautions emphasized in this discussion on food colors and their uses is as much a factor in the production of uniform quality foods as is the selection of ingredients, equipment or methods of processing used. Because these precautions have to do with a material used in very small quantities they are too often disregarded, with resulting trouble for the user of food colors.

Conditioned air is used in the processing department of Case Moody Pie Corp., Chicago.

Sixteen Things That Can Go Wrong With AIR CONDITIONING

Troubles that may be encountered in food plant installations and how they are solved

Part II

By C. I. ELLIOTT

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New York, N. Y.

9. Bacterial Contamination

SELECTION of the outside air intake location cannot be made too carefully. The seriousness of this can best be shown by the following case. A large food manufacturer, without consulting an air-conditioning engineer, installed a conditioning apparatus for one of the large process rooms. The outside air intake was simply punched through a wall of the room and extended out over the adjoining roof of the same plant. Several years preceding this incident, the city health department had demanded that the sewer system be vented. In compliance with the demand the company provided a 6 in. sewer vent up through the roof. The point selected for the outdoor air supply was near the sewer vent. The sheet metal worker did not question the location of the outdoor air connection and followed the original instructions. Soon after the system was placed in operation a serious product infection developed.

Nothing that was tried would stop the trouble. Finally, when it reached such proportions as to threaten the failure of the company, an outside engineer was called in and fortunately found the cause of the difficulty. The vented gas from the sewer system contained a type of bacteria very dangerous to the product being manufactured. The so-called air conditioning equipment was inadequate and failed to remove these bacteria; therefore, the foregoing result occurred. (See Fig. 5.)

10. Carbon Contamination

A comparable case (not in the food industry) was the placing of an outside air intake in a silk finishing room in a location such that carbon particles from the stack of an oil burning power plant were drawn in and deposited on the goods. This caused a second grade product. Here the difficulty was: first, the location of the intake toward the smoke stack; and second, the use of improper filters for the removal of such dirt. Changing the intake and installing new filters corrected this installation.

11. Improper Insulation

In a recent installation, the required room conditions were maintained, but in certain locations condensation appeared on the walls and on spots of the ceiling. Quite naturally the plant manager objected to this. The condition caused spoilage when moisture dropped on the product, and second, it resulted in painting and cleaning difficulties. Investigation revealed that after the completion of the conditioned space, the plant had been further expanded by the addition of two low temperature rooms. These had been built one above and one adjacent to the air conditioned room.

The ceiling condition was investigated, and it was found that, although the floors of the cold rooms upstairs were provided with insulation, the steel columns extended in a continuous piece through both rooms, and the usual insulating collar had been omitted. The low temperature was transmitted down the columns to the ceiling beams of the conditioned area, thus making the temperature of these areas lower than the dew point of the room air, with consequent moisture condensation. The end wall was the same story. Adequate insulation of the areas mentioned above eliminated the condensation.

12. Tampering with Controls

A frequent cause of trouble with industrial air conditioning installations occurs when workers must be in the area conditioned. Quite often the proper condition for the material undergoing process is not the proper condition for personal comfort of the workers.

It is very difficult to get the idea

across to those workers that the plant is air conditioned for the product that is being processed, and not for them. But, of course, they always maintain that the same products were made before air conditioning came into the picture. It is always possible to find among such a group an individual who knows enough to readjust the controls. When the group is working in the area he sets the controls for a condition better suited to human comfort and less suited to the product.

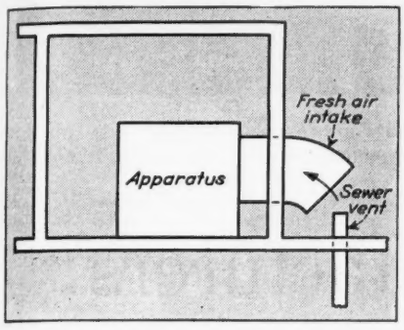


Fig. 5—A large food manufacturer made this mistake. The air intake for a processing department was installed near a sewer vent. The vented gas contained bacteria dangerous to the product.

Upon leaving at night, he readjusts controls to suit the needs of the product.

In one plant, processing during the day was difficult, but at night conditions seemed to improve. It was discovered by the use of recording instruments that the air conditioning during the day did not meet with the requirements of the product, while at night they were correct. It required weeks of careful watching to learn that an operator who objected to conditions in the room would change the setting of the controls and at night would reset them. The method of correcting this willful interference was to provide new instruments that could not be tampered with by the employees.

13. Pump Installed Wrong

In one installation, considerable difficulty was experienced due to apparent lack of refrigerating capacity. Externally, no change was visible; the cooling water was circulating and in the proper quantity. This system was a closed system. using finned chilled water coils in the air conditioning apparatus and a closed water cooler with a circulating pump. In an effort to get extra capacity, not needed originally, the customer had conceived the idea of increasing the size of the pump and, in so doing, simply called in a pump man who sold him a pump. When the new pump arrived, the engineer connected it to the old lines but he made the connection in such a way that the flow of water was reversed. As a result, the air and water flow became parallel, instead of counter, with resultant loss in capacity.

14. Air Went to One Outlet

Considerable trouble was experienced in the air distribution on one job. It was found that most of the air was being discharged from the far or tail ends of the distribution ducts. A reading of static pressure along the ducts indicated a high static pressure at the tail end and a slight pressure at the entering end. In fact, it was almost a vacuum near the latter point. The duct velocity was found to be as high as 4,000 ft. per minute, and the cause of the difficulty was the fact that the kinetic energy of the high velocity air was being converted to static energy. This caused a high static pressure at the tail ends of the ducts and practically none at the entrance to the ducts. This was remedied by the installation of air deflector vanes, or scupper sheets, in the ducts to pull some of this air out of the ducts at the entering end. These were adjustable and thus made a reasonable means of obtaining uniform distribution.

15. Misunderstanding of Needs

Quite often a difficult situation arises due to not understanding the customer's needs or wishes. Frequently the customer actually misleads one, not intentionally, of course, but by reason of the fact that he himself does not know what is required. A test run on the product is advisable to determine exactly what is needed. Close cooperation between the air conditioning engineer and the manufacturer is necessary for successful air conditioning.

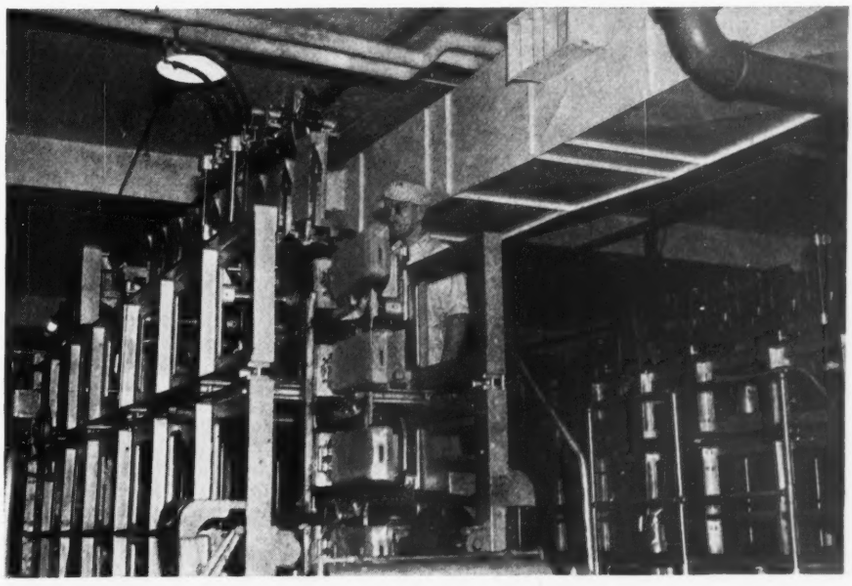
Makeshift procedures to try to control indoor conditions of air often lead to greater expense than installing a complete, well engineered system, and the well engineered system is the only kind that is dependable. An air conditioning engineer should be consulted on even minor building changes which may affect an air conditioning system.

16. Obstructing Air Movement

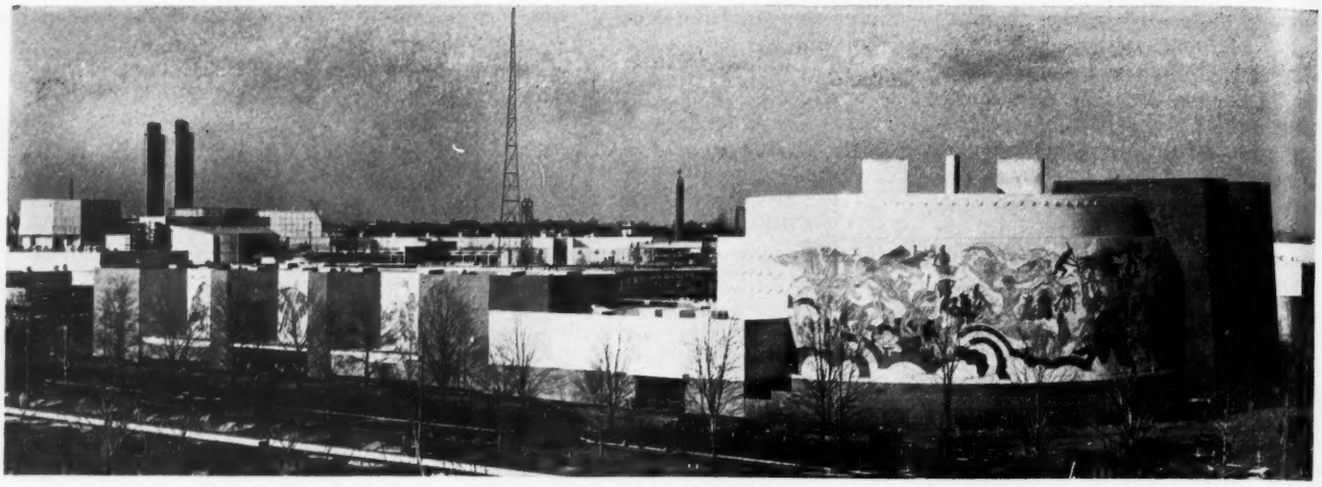
Loading of a conditioned space with a product in such a manner as to block or interfere with air circulation should be avoided. Not infrequently some worker who is sensitive to drafts, or who perhaps has just cause for complaint, will have certain air outlets blocked with cardboard or other material. Since the fan may have the characteristic of bucking this condition, the result is frequently an increased pressure that will cause progressive trouble with drafts throughout the rest of the conditioned area.

The proper correction for this is the *relocation of the outlet*, or other changes in the system, to remove the cause of the original complaint.

Every air distributing system should be properly balanced at the time it is installed. This requires a knowledge and experience in that particular technic, which is rarely, if ever, found except in those who specialize in air conditioning.



Air at the proper temperature and humidity facilitates operations in the packaging department of the Post Products division of General Foods Corp., at Battle Creek, Mich.



Last year this was Food Building North. This year it is the Food Building, in which all the smaller food exhibits will be grouped.

Food Manufacturers' Exhibits

Will Again Dominate at World's Fair

ON an attendance basis, food exhibits stole the show at the New York World's Fair 1939. And a preview of the 1940 extravaganza indicates that the repeat performance will be at least as successful. About the same number of food companies will have exhibits, with about the same amount of space. Fundamentally, the important exhibits will follow the same pattern as last summer, but they will be polished in spots to remove defects that were exposed by the cold light of experience. The exhibits of the other industries will be polished, too, so food will hold about the same relative importance.

Missing from the list of important food companies among the exhibitors last year will be General Foods Corp., Libby, McNeill and Libby and Curtiss Candy Co. New in the Food Building this year will be Shefford Cheese Co., Liberty Orchards Co., Boston Tea Co., the U. S. Department of Agriculture, the state of Florida, and four or five companies whose plans have not yet been completed.

No focal food exhibit will be sponsored by the Fair this year. But little will be lost, judging from the inattention which the past one attracted. The building in which the focal exhibit will not be staged, Food South, will be entirely occupied by the Coca-Cola exhibit and will be known as the Coca-Cola Building.

In addition to the Coca-Cola exhibit, six companies will have their own buildings: Beech-Nut Packing Co., Borden Co., Continental Baking Co., National Dairy Products Corp., Standard Brands, Inc., and Swift & Co. H. J. Heinz Co. will occupy the Heinz Dome of the old Food Central Building and will be the only food exhibitor in that building.

All of the other exhibits of food manufacturers (17 to 20) will be in the old Food Building North, this year designated simply as the Food Building, except for the exhibits of Doughnut Corp. of America.

Company by company, here are the stories of their shows:

Beech-Nut Packing Co.'s "biggest little show on earth," the popular toy circus and circus parade, will again be the main feature at its exhibit. There will be continuous 20 minute performances on the 58 ft. stage. Dioramas showing and growing and processing of various Beech-Nut foods will line the walls of the building; the coffee and chicle dioramas were quite popular last year. Samples of Beech-Nut gums and candies will be handed out by colorfully costumed twins, and dietitians will be available to discuss food problems. Orders for Beech-Nut products will be taken. An additional display counter for Beech-Nut products takes the place of the coffee bar at last year's exhibit. The exhibit will be among the largest at the Fair.

Borden Co. rang the bell at the 1939 Fair with attendance of 7,743,000, drawn by its Rotolactor and herd of pure bred cows. And it also struck the gong in advertising last year by personalizing the cow through that belle of the bovines, Elsie. These two hits will be combined at the 1940 Fair. Elsie will be placed in the romantic setting of the boudoir.

A cooking school for men will be operated, with prizes going to those who prove their mettle at the culinary arts. This will get attention because members of the audience will participate. Another innovation will be a wood carving department where items for the home will be made and mended.

Milk from the Rotolactor herd will be pasteurized and bottled and sold in the restaurant and at milk bars operated by several groups of twins and a set of triplets. Mel-O-Rol ice cream will again be manufactured. The exhibit will occupy some 80,000 sq. ft. Its purpose is to show the best methods of operation from the dairy farm through distribution.

Coca-Cola will be promoted by a larger exhibit this year. The entire Food South Building has been taken by Refereshment-at-the-Fair, the distributors of the beverage on the grounds. In the building will be a modern bottling plant with a capacity of 140 bottles a minute, this plant supplying the Coca-Cola drunk at the Fair. Supplementing the bottling

plant will be an immense overhead mural on "The Pause That Refreshes." In a "little theatre" adjacent to the plant will be continuous performances of a two-reel, all technicolor movie "Refreshment Through the Years." Scenes illustrating the popularity of Coca-Cola overseas will adorn the walls.

A commodious "Garden of Refreshment," built around a waterfall and brook, and with a landscaped terrace, will provide a shaded retreat which invites guests to relax and enjoy "the Pause that Refreshes."

Continental Baking Co. reached the top rungs of the ladder of success at its exhibit last year. So this year there will be only a few minor changes. In Wonder Bakery the company will operate complete modern plants for the production of Wonder Bread and Hostess Cup Cakes. The visitors will be given an idea of the care, skill and sanitation required in manufacturing bread and cake. A trade-name and trademark tie-up will be made through animated "Alice in Wonderland" characters and brightly colored balloons significant of the design on the bread wrapper. Hostess cakes will again be sold.

Doughnut Corp. of America will have two exhibits, one in the exhibit area and the other in the amusement zone. At the former, in the Medicine, Health and Science Building, the doughnut equipment will be on display —making doughnuts, plain and fancy. The purpose of this exhibit, which will seat 1,000, is to introduce doughnuts to millions of new customers. Maxwell House Coffee and light lunches will also be sold. "Pep Up with Donuts" will be the theme.

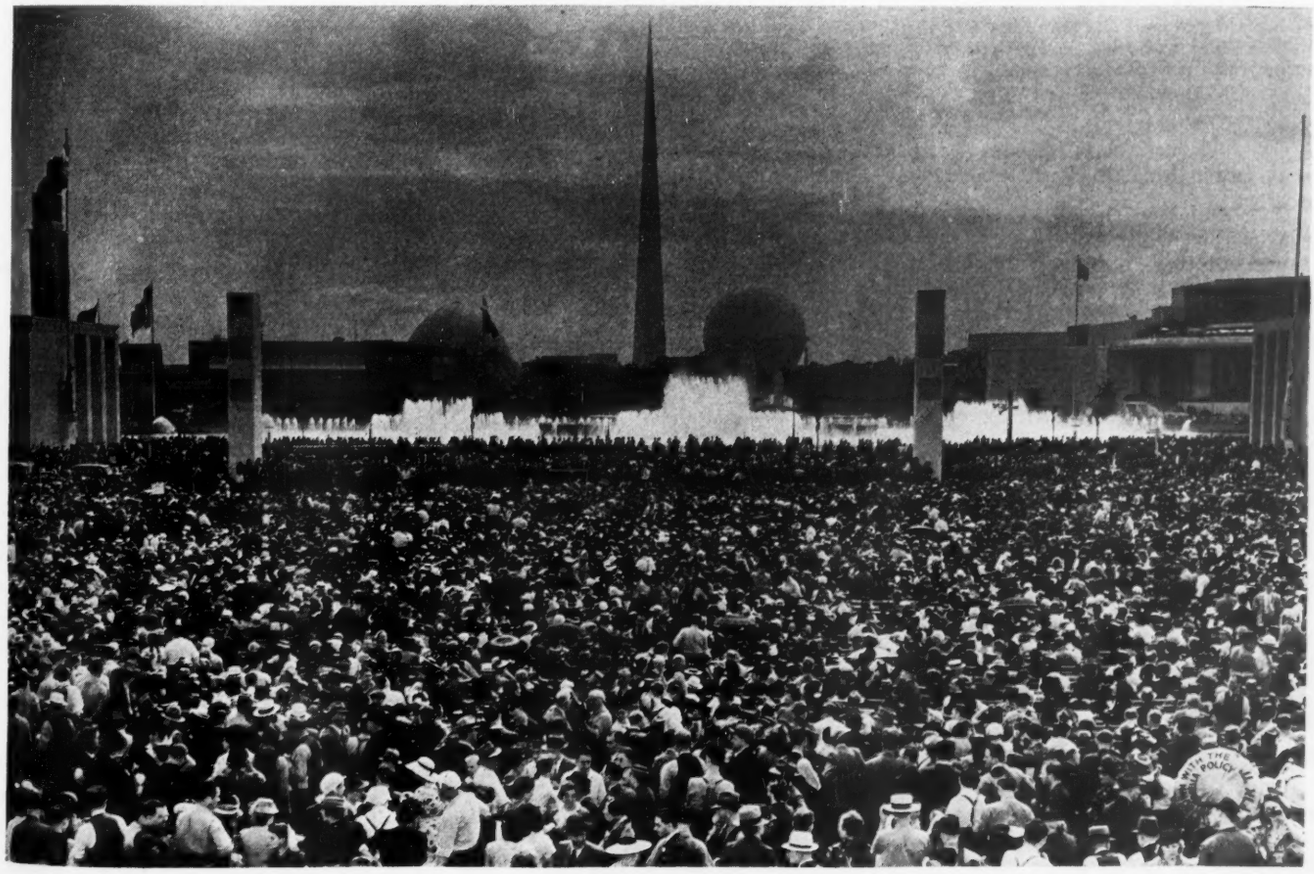
A Mayflower 5 and 10 cent restaurant will be the second exhibit.

H. J. Heinz Co.'s exhibit will occupy more space than last year, "because we had more visitors in 1939 than we could comfortably accommodate." Additional space has been taken adjoining the Heinz Dome in the Food Central building. Attention will be directed to the dome by a famous 16-ft. sculptural piece, "Goddess of Perfection," to be placed atop it. This 130-ft. elevation will make the figure visible from many parts of the grounds. As last year, Heinz will capitalize on the public interest in hydroponic, or soilless gardening, many varieties of both flowers and vegetables being grown. Progress in household equipment will be shown through the medium of eight kitchens, four being typical of different periods in the history of this country and four representing England, France, Spain and Holland. Visitors will have an opportunity to taste Heinz products.

National Dairy Products Corp. will have an effective Sealtest System exhibit. Extensive changes have been made in the method of presentation. This year the exhibit will show how the contributions of the pioneer scientists—Leeuwenhoek, Lister, Pasteur and others—are now the backbone of today's medical knowledge and scientific skill.

As last year, National Dairy's building will house fully equipped plants for pasteurizing and bottling milk, freezing ice cream and packaging cheese. There will also be an experimental kitchen testing laboratory and a dairy bar for serving food.

Standard Brands, Inc., will have many attractions and several educational exhibits in its four-pavilion building and open-air theater. The biggest attraction, of course, will be the marionette show, featuring Edgar Bergen, Charlie McCarthy and Mortimer Snerd, this show being a big hit last year. The company is also repeating these displays, popular last year: coffee roasting, cutting and wrapping yeast, production of high-quality bakery products, how to use Royal Desserts, eye tests to determine vitamin A deficiency, and bicycle-driven dynamometers to show the energy value in bread. Then the following new exhibits will be opened: an exhibit of vitamin food equivalents, a display showing why vitamins are needed in the body, a machine which packs tea balls, an Edgar Bergen-



No predictions are being made as to attendance at this year's World's Fair in New York. But, as indicated by this scene from last year, people will be there. The net paid admission in 1939 was approximately 26,000,000. This view looks from the Court of Peace across the Lagoon of Nations and down Constitution Mall. On the left may be seen the Heinz Dome and on the right, across the Mall from it, the top of the rotunda of the Food Building.

Charlie McCarthy party-line telephone on which visitors may listen in, and a meter to measure the visitors' vitamin B_1 requirements. There will be other displays, as "Standard Brands Abroad." At the longest coffee and tea bar in the world will be sold sandwiches, baked products, coffee, tea, desserts and what not. Souvenir packages of tea balls will also be sold.

Swift & Co.'s major attractions will be the same as at the 1939 Fair. Located in an airplane-shaped building on a 2½ acre landscaped site, these attractions will be the manufacture of frankfurters, ham smoking and wrapping, and bacon slicing and packaging.

Streamlined processing equipment, advanced production methods and attractively uniformed girls and men will attract attention to the manufacturing exhibits. The smokehouse is glass-enclosed, permitting Premium hams to be seen in the different stages of the smoking process. The bacon and frankfurt operations are in glass enclosed pavilions in the "wings" of the building and will accommodate large crowds of onlookers. This exhibit will appeal to the nose as well as to the eye, as the aroma of smoking hams will permeate the atmosphere.

In the Food Building

Canada Dry Ginger Ale, Inc., will utilize murals to tell the story of its products, their methods of manufacture and its advertising history. Supplementing these to get attention will be a "Metamorphisor". This machine will show bottles of Canada Dry's products turning into appetizing drinks. Another display unit will include a giant illuminated Canada Dry bottle. There will be a service bar at which the company's beverages will be sold. The exhibit occupies 1,074 sq. ft.

G. Washington Coffee Refining Co. will have comely college girls demonstrating its product. Standing behind a glass enclosure, the demonstrators will address their audience through a concealed microphone. G. Washington coffee will be sold, along with light lunches, in a coffee shop. The exhibit will be air conditioned for comfort and paneled with three-tone mirrors for striking appearance. It will occupy 1,100 sq. ft.

The Junket Folks (Chr. Hansen's Laboratory, Inc.) will spend approximately $100,000. The exhibit will be of the demonstration type, with a score of attractively attired attendants passing out tasting samples of ice cream, fudge, Danish dessert and rennet-custards made with Junket food products. And the exhibit will dramatize the ease of making these products. Attention will be attracted by a revolving display containing disappearing mirrors. Modernistic murals and animated dioramas will assist in catching the eye. Junket products will be sold. Dietitians will answer questions on child feeding, home making and so forth. A recipe book, a booklet on child feeding and several technical handbooks will be offered. This exhibit will cover 1,000 sq. ft.

Loose-Wiles Biscuit Co.'s little Sunshine Bakers, the singing and dancing midgets whose antics amused Fairgoers in 1939, will perform again this year. The company will utilize the midgets to tell the story of quality in its products. The exhibit will occupy 1,000 sq. ft. and cost $50,000.

National Biscuit Co.'s cartoon movie, "Mickey's Surprise Party," delighted so many Fair visitors last year that it will run again. This show does more than entertain. It effectively suggests and demonstrates uses of the company's leading products. The circular theater seats 266, and continuous 15-minute performances will be given. Also, as per last year, NBC will have the animated Tony Sarg puppets moving around the outside of the theater.

Northwestern Yeast Co. will have two new features. The exhibit theme, home baking, will be put across in color blowups of the finished product on display and by a continuous sound movie of the bread making process. The commercial operation of pretzel making, the principal attraction last year, will be used again, fresh pretzels being made and sold over the counter. Samples of Maca Yeast will be distributed and the product will be sold. The exhibit will occupy 800 sq. ft.

Planters Nut & Chocolate Co. is taking twice as much exhibit space as last year to make the Fair visitors nut conscious. In a space 65x25 ft., the exhibit will be built around an animated diorama depicting the "Adventures of Mr. Peanut in Tiny Town." The scene will comprise over 65 moving miniature figures which portray the capture of a massive Mr. Peanut in the land of Lilliput. Other features will support the main display, such as Mr. Peanut balancing cans of nuts on his nose, and motion and translite pictures showing how peanuts are grown and processed.

Taylor Provision Co. intends to duplicate last year's success with the same exhibit. Two things will attract attention, the unusual and inviting appearance of the "Old Colonial Inn" exhibit and the enticing aroma of frying meat. Sandwiches, the largest at the Fair, will be sold for 10 cents to get people to try the genuine Taylor Pork Roll. Taylor will have 400 sq. ft.

Wagner Baking Corp. will again make and bake pies and sell them hot over the counter. The pies will be filled, the crust trimmed by machine and the product baked in a gas-fired oven. As last year, crowds will be attracted by the action of the manufacturing operations and will be sold on the product by its flavor. Orders for gift packages will be taken. This exhibit will take 1,160 sq. ft.

Ward Baking Co. will have an exhibit that merchandises the theme of its national advertising campaign—that winners in all walks of life eat Tip-Top bread. There will be enlarged photographs of celebrities in sports and other fields who have endorsed the company's product, this being a new exhibit feature. A lounge will be provided in which anyone may rest for awhile. Products will be displayed and recipes of the favorite dishes of "winners" using Tip-Top bread will be given away. The exhibit will occupy 750 sq. ft.

Wm. Wrigley Jr. Co. will employ a unique type of sampling. It will have a long counter where visitors may address envelopes to themselves. These envelopes will then be sent to Chicago and a souvenir sample card, containing samples of the company's leading brands of gum, will be enclosed and mailed. A lounge will be provided for Wrigley wholesalers and retailers. The exhibit will cover 2,000 sq. ft.

Other companies, notably breweries, will operate restaurants.

You are looking into Elsie's boudoir, a new, interesting and amusing exhibit to be included in the Borden building.

GOOD PACKAGING
Demands Proper Use of Adhesives

Packagers of food products should select adhesives to suit the packaging materials used and the service required, and then apply these adhesives in the best way

By JAMES P. LANGWILL
Chemist, in charge of packaging research
Reynolds Metals Co., Harrison, N. J.

This article on
PACKAGING
Is of importance to
All Food Manufacturers
Because the proper selection and use of adhesives in the packaging of food products is an increasingly important factor in sales and in obtaining and maintaining consumer good will.—The Editors.

Part II*

Basic Types of Adhesives

ADHESIVES with their numerous and varied uses furnish one of the most difficult subjects upon which to generalize. Nearly every use constitutes a particular case of its own. The sealing operations in modern packaging methods are so diverse that there no longer exists such a thing as the *one best* adhesive. There probably is, however, one best *kind* of adhesive for each particular operation.

In the following discussion, the various adhesives are divided into groups according to the base materials used in their preparation. Often adhesive solutions in use today are a mixture of two or more basic types, the combination of which, generally speaking, involves no chemical reaction. The resulting mixture possesses characteristics which may be attributed to each of its component parts. Each component contributes characteristics in proportion to the amount of it which is in the mixture.

Sodium Silicate Adhesives

The term sodium silicate or silicate of soda may be applied to all combinations of sodium oxide and silica in aqueous solution. Not all the forms of sodium silicate can be used as adhesives, however. All sodium silicate solutions are clear, decidedly alkaline, and possess neither natural color nor odor. They are neither toxic nor inflammable. Solutions of sodium silicate are inorganic and therefore cannot support the growth of organisms. They are also repellent to insects which feed on films of animal glue or vegetable adhesives.

Density, an important physical property of this adhesive, increases with the viscosity of the solution. The rate of this increase varies with the ratio of sodium oxide to silica. All forms of sodium silicate are less tacky than animal glue or dextrin. But the denser (more alkaline) forms possess sufficient tack to overcome the tendency of some surfaces to spring apart.

When sodium silicate has once dried it is not easy to redissolve. While not entirely waterproof, sodium silicate films are quite moisture resistant. These adhesive films are very strong, usually stronger than the tensile strength of paper and paper stocks. While the bond formed by a sodium silicate adhesive is stronger than the bond formed by a starch paste, it is not so strong as that of a good animal glue adhesive. Sodium silicate is an inexpensive adhesive and the user may be assured of obtaining a product of uniform quality.

In addition to possessing great strength, these films are hard and brittle. They impart rigidity and strength when used to join packaging materials. This, of course, is a decided disadvantage when great flexibility is required. These adhesive solutions are quite stable; films are very slowly decomposed by carbon dioxide in the air. Paper goods made with sodium silicate adhesives have retained their strength for years.

The alkalinity of these adhesives may attack all colors used on labels except black and white. Recently, however, there has been made available an ample range of alkali-resistant colors, thus eliminating this hazard.

Starch-Derived Adhesives

Starches are capable of producing adhesives equivalent to solutions made from the most divergent of raw materials, such as rubber and cellulose derivatives. Closely allied with starch in the production of adhesives is flour.

Dextrins are next in importance to the starches. They may be considered to be good substitutes for the natural gums since they are about equally soluble in water but are less expensive and possess less thickening power. It is thus possible to make more concentrated solutions, which are very sticky and dry rapidly. Dextrin and glucose are formed by the hydrolytic decomposition of flours and starches. Highly-dextrinized starches are almost completely soluble and consequently possess the maximum of adhesive power. A maximum of glucose is desired, since its diminishes adhesion and introduces hygroscopicity.

The preparation of adhesives from starch may be accomplished in one of two ways:

1. When the hydrolysis is effected in the cold by means of caustic alkali, a viscous paste of a ropy nature is formed.

2. If the starch is treated with an oxidizing agent at a higher temperature, there results a thicker paste which is more dense.

Normally, very few starch or dextrin adhesives are truly neutral. They are usually made more or less acid or alkaline in reaction in order to assure better adhesion and stability. The neutralization of a starch-alkali paste reduces the adhesive power and the paste assumes a more gelatinous consistency. Upon stand-

*Part I of this article, dealing with how adhesives work and how they should be applied, appeared on pages 55 to 57, of "Food Industries" for March, 1940.

ing, starch-derived adhesives tend either to become fluid or to thicken. In highly concentrated solutions, this thickening is accelerated. Starch or dextrin solutions are likely to lose their original viscosity by fermentation or by the reaction of dissolved constituents. Crystallization, which reduces film strength, is most likely to be encountered in starch-derived adhesives. To overcome this undesirable feature, it is sometimes advisable to add one of the hygroscopic materials mentioned above. The strength of the joint obtained with starch base adhesives is equal to that obtained with a medium grade animal glue, while the cost of the starch adhesive is about one-third to one-half.

Protein Adhesives

In recent years, the need for moisture resistant adhesives has led to the development of casein products. These were practically unknown in this country until about 1917.

The higher the ash content of a casein, the greater the amount of water required to yield an adhesive of standard viscosity. The more water added to a casein in its preparation, the shorter becomes the life of the solution. The "life" of an adhesive is considered to be the period between its preparation and the time when it becomes too thick to use. All casein adhesives have a limited working life which usually varies from 6 to 12 hours.

The material which renders a casein adhesive moisture resistant is lime. The moisture resisting properties of casein and similar protein adhesives is caused by their limited ability to absorb water. The dried adhesive film, even when subjected to intensely humid conditions, still has sufficient strength to hold.

Casein adhesives are about one-half as expensive as animal glue adhesives of medium quality. They are, however, considerably more expensive than vegetable-base adhesives. Nevertheless, their moisture resistant properties promise to give them a wider range of application.

Cellulose and Synthetic Resin Adhesives

Cellulose adhesives usually consist of a cellulose ester, a resin, a low or medium boiling solvent, one with a higher boiling point, and a plasticizer. The nitrate of cellulose is most commonly used. Cellulose acetate is used more as a special purpose adhesive and is usually a more expensive component. Among the resins commonly used in an adhesive of the cellulose type are wood rosin, coumarone resin, dammar gum, and ester gum. Resins are included in adhesive formulation for several reasons. First, they are less expensive than the cellulose derivatives. Second, while they influence the viscosity of the adhesive mixture very little, they improve its density and make thicker adhesive films. Resins also improve hardness and increase adhesive power.

Cellulose base materials and practically all resins have a brittleness that increases with age. To counteract this characteristic, as well as to give flexibility and overcome the shrinking responsible for cracking and shattering, plasticizers are added. These substances may be either liquid or solid, the liquids being probably the most widely used phase. Liquid plasticizers are usually clear, colorless, "oily" liquids which sometimes have an odor. They possess stability to light, acids, and alkalis and are resistant to water and grease. Practically all plasticizers are flexible at low temperatures and possess very high boiling points. They are compatible with most, but not all, resins.

Synthetic resin adhesives are of a less complicated nature. They consist of a solution of synthetic resin, with or without a natural resin, in an organic solvent of comparatively low boiling point. Among the resins commonly used are those derived from acrylic acid esters, vinyl esters, and ureaformaldehyde condensation products. The synthetic resin adhesives usually contain quite high percentages of dry material.

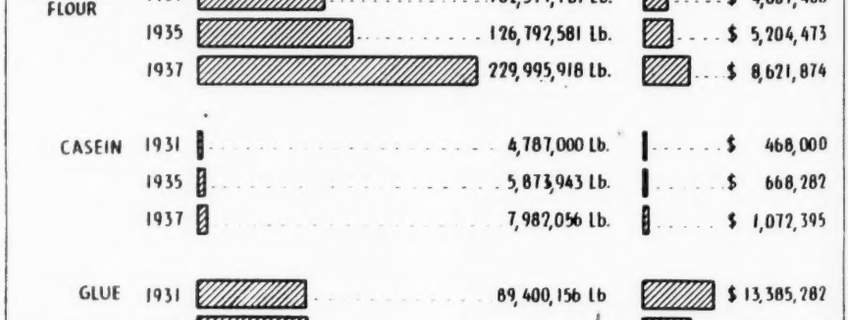
Adhesives of the cellulose and synthetic resin type possess a softening action on transparent cellulose sheetings as well as on coated papers and metal foils. Often this action penetrates beyond the outer surface of the materials to be joined. Whenever this happens, the time required for drying is greatly increased. In most cases, the use of this type of adhesive will call for a longer drying time in which to obtain a satisfactory bond.

Both cellulose and synthetic resin adhesives give strong, flexible, moisture resistant joints. The two outstanding disadvantages in the use of these adhesives are loss of the solvent, and odor. Evaporation of the solvent may cause stringing of the adhesive during its use; sufficient loss of solvent will result in too high a viscosity for proper application. It is very seldom that the replacement of solvent or the solvent mixture will produce the desired result without thorough mixing. This can be accomplished only with a considerable loss of time. Even with the most careful and judicious selection of solvent or solvent mixtures, there remains in most adhesives of this type considerable odor. The rapidity with which this odor is dissipated depends upon the method of application, the conditions in the room in which it is applied, the speed of the operation, and the conditions to which the package is subjected directly after sealing.

One of the main drawbacks of this type of adhesive is its high cost. In spite of this, there are enormous possibilities in regard to its use. It must be remembered that this type of adhesive is comparatively new and the production of new synthetic resins is growing by leaps and bounds.

Gelatin and Glue Adhesives

Throughout this paper, I have purposely referred to adhesives as such and have tried not to make the word adhesive synonymous with glue. Adhesives is the name of a *class* of ma-



Comparative trends in production and value of three basic adhesive materials, based on statistical data from the 1927 Census of Manufactures.

BASIC TYPES OF ADHESIVE

	Sodium Silicate	Starch Derived	Protein	Cellulose and Synthetic Resin	Gelatin and Glue	Rubber	Hot Melt
Source	sodium oxide and silica	Solubilized starch and dextrin	casein from milk and soya bean albumin from blood and egg	cellulose nitrate and acetate resins of vinyl ester, urea-formaldehyde, acrylic acid	hot water extract of nitrogenous animal and fish tissue	latex vulcanized rubber rubber resins	paraffin, ceresin, rubber, synthetic resins, cellulose esters
Relative Cost	low	low to medium	medium	high	high	medium to high	low to high
Odor	none	none to slight	none to slight	strong	slight to strong	strong	none to slight
Moisture Resistance	medium	medium	high	high	low to medium	medium	high
Bonding Strength	high	medium	medium to high	high	medium to high	medium	low to high
Type of Solvent	aqueous	aqueous	aqueous	non-aqueous	aqueous	aqueous or non-aqueous	none
Application Temperature	cold	cold	cold hot	cold	hot	cold	hot

terials while glue is one of many basic substances used in their preparation.

Glue is very closely allied with gelatin. Gelatin, familiar to most food manufacturers, may be considered to be a very pure glue, while glue may be considered to be an impure gelatin. Pure gelatin is not a particularly good adhesive. Glue is deeper in color than gelatin, possesses less thickening power, but yields more highly dispersed solutions in water. Neither gelatin nor glue exists as such in nature. Both materials are obtained by hot water extraction of nitrogenous animal tissue, as hides and bones.

Glue from hides is of better quality than that extracted from bones. Hide glue sets more rapidly and is more flexible than bone glue. The strength of a glue is in direct proportion to its melting point, the higher the melting point, the greater the strength. This strength decreases with the length of time it is heated in solution. Animal glue adhesives form very strong joints. However, this is one of the most expensive classes of adhesives.

Vigorous agitation and prolonged heating result in a decrease in viscosity. Undue agitation by a mechanical spreader will cause animal glue adhesive to foam. Since all adhesives of this type are applied hot, their tendency to foam is increased by heating. Inferiority in the quality of the glue with which the adhesive is made is responsible for much of this foaming. Often this may be checked by the addition of very small quantities of an edible fat or oil.

Glue derived from fish has never been considered as valuable or useful as that from animals. Fish glue has comparatively low strength, absorbs water quite readily, and possesses a well-known odor. Isinglass is a colorless and odorless gelatin obtained from fish. This is quite resistant to moisture but because of its high cost, it cannot compete with gelatin from hides and bones.

Rubber Adhesives

Rubber adhesives may exist in either aqueous or non-aqueous solutions. An aqueous rubber solution contains latex, a highly dispersed emulsion of rubber particles naturally occurring in an aqueous serum. The serum is a water solution of proteins, sugars, fats, minerals, and resins. An aqueous rubber adhesive is susceptible to bacterial fermentation which may be prevented by a slightly ammoniacal solution. Most aqueous rubber adhesives contain ammonia and it is necessary to add a little to the water used in mixing or diluting these solutions to prevent coagulation. The odor of ammonia, persistent in all types of aqueous rubber adhesives, is a drawback to their use, although the odor disappears in time.

Non-aqueous rubber adhesives are solutions of rubber or rubber resins in organic solvents. It is safe to say that all these adhesives possess a very disagreeable odor. Gutta-percha, which is obtained by the evaporation of a natural latex, is sometimes used in the formulation of these adhesives. Although this material is plastic, it is not elastic. The high cost of gutta-percha prevents its extensive use.

Rubber adhesives produce films which are quite resistant to moisture, alkalis and dilute acids. They do, however, deteriorate quite rapidly when exposed to air and light. The cost of these adhesives is considerably more than that of starch and dextrin.

Dried films or coatings of cellulose or synthetic resin adhesives on paper, metal foil, or transparent cellulose sheetings may be classed as hot melt adhesives. The waxes, paraffin and ceresin, are also examples of hot melt adhesives. They may be used alone, in combination, with resins, or with rubber. Ceresin is a white or yellow wax derived from ozokerite and having properties similar to beeswax.

Hot Melt Adhesives

The advantages of hot melt adhesives are their moisture resistance, instantaneous sealing, and complete absence of water during application. Because of its crystalline structure, paraffin wax is not so permanent as the amorphous ceresin. Dried films of cellulose or synthetic resin adhesives must be freed from solvents before heat is applied or the solvent odor will permeate the packaged food.

Some of the wax base hot melt adhesives do not possess very much cohesion. That is, the tendency of the particles of the hot melt to hold together is not great. The adhesive properties may not be affected by this condition. It is then of utmost importance to use as little as possible of the adhesive to secure a strong bond.

Hot melt adhesives of the wax type are relatively cheap. Often the dried films of cellulose or synthetic resin adhesives are an integral part of the packaging material. This material is referred to as heat sealing and as such its total cost includes that of the adhesive.

The food packer will not tolerate a penetrating odor in the adhesives he uses. There are several factors which must be considered when using an adhesive, the virtues of which outweigh an odor of appreciable intensity. This does not imply that the packager of food products will compromise on the odor, but rather than he will alter either the adhesive, the packaging operations and subsequent handling, or both, in order to eliminate the hazard of this contamination. The factors influencing this adjustment are: (1) the volatility of the material possessing odor or that of the solvent contributing to it, (2) the conditions affecting the package from the time of sealing until it is packed in the shipping case, (3) the proximity of the adhesive to the actual food product.

Although gelatin and glue adhesives continue to enjoy widespread acceptance in many industries, their use in food packaging is diminishing. There is a growing trend toward the starch derived adhesives. Any attempt to forecast future events and trends is always interesting speculation. A rather slow and perhaps obscure growth in the use of synthetic resin adhesives is nevertheless in progress.

Utilization of Skim Milk In a New Potato Product

This article on

BYPRODUCT UTILIZATION

Is important to

Bakers
Milk Processors
Potato Handlers

Because it tells how to make a new product which will promote the use of byproduct skim milk, will add a new outlet for potatoes and provide a new product with nutritional and flavor appeal for bakers, biscuit and specialty manufacturers.

—The Editors.

By B. H. WEBB

Division of Dairy Research Laboratories, Bureau of Dairy Industry, U. S. Department of Agriculture, Washington, D. C.

A PROCESS for the production of a new potato-skim milk product* has been developed by the author as one means of increasing the consumption of surplus skim milk in foods. The new product may be made in the form of wafers, sticks or croutons. These products differ from shoestring potatoes and potato chips in that they contain skim milk solids but not fat. They are made by whipping air into a mixture of skim milk, riced boiled potatoes, salt and pepper or other flavoring. The whipped mix, resembling mashed potatoes, is extruded through an orifice to give the desired form and then dried on wire screening in a hot air tunnel. The dried product is finally toasted to produce a light brown color.

The accompanying flow diagram gives the sequence of the simple steps involved in the manufacture of the product. The first part of the process requires little comment since it consists only in washing, sorting, cooking and peeling the potatoes. The second part is composed of the steps which result in the production of various forms of potato wafers.

The figures in Table II for a 5-lb. batch of finished wafers are based on research done with the experimental equipment used in the development work. This table and the following data will furnish information useful in adapting the process to commercial production. Sixteen pounds of potatoes and the equivalent of 16 lb. of fresh skim milk were required for this batch.

The hot mix was whipped for five minutes and developed a 60 per cent overrun and a total volume of about 4 gal. A variation in overrun of 50 to 80 per cent and in specific gravity of the mix between 0.58 and 0.65 was permissible.

The whipped mix was extruded through rectangular openings 1-1/16 in. wide, with ridges along the top surface which gave a strip varying between $\frac{1}{8}$ and $\frac{1}{4}$ in. high. The extruder operated above a moving wire screen tray with an effective drying surface of 21.7 x 21.7 in. The distance between the strips was 3/16 in. making the total width per strip $1\frac{1}{4}$ in. Twelve trays were necessary to dry the 19.6 lb. mix. A drying surface of 1,130 sq. in. per pound of finished wafer was required, and the inside measurements of the dryer were 2 x 2 x 6 ft. The drying time was approximately one hour at 85 deg. C. (185 deg. F.). The trays of dry product were passed under a battery of electric heaters and toasted a rich golden brown in a fraction of a minute. The finished pieces weighed approximately 0.516 grams per linear inch. A No. $2\frac{1}{2}$ can held about 106 pieces with a net weight of 240 grams or 0.53 lb.

White potatoes of any grade that will yield a light mashed potato have been found suitable for the manufacture of potato wafers. This makes possible the use of small or cheaper grades of potatoes. Soluble spray-dried skim milk is a very convenient form of milk product to use, but unsweetened condensed skim milk of 28 per cent total solids, with no added water, may be substituted for the dry milk.

The proportions of skim milk and potato given in the formula (see Table I) may be varied over a rather wide range, but the formula as given appeared to produce the best product. Whey solids may be substituted for skim milk, but when this is done a more fragile, weaker-bodied wafer is obtained. A combination of whey and skim milk can be used.

The incorporation of air in the mix during whipping is an important factor controlling the porosity or texture of the finished product. A light, high overrun mix can be dried to produce a very tender, porous wafer, while a dense mix yields a hard, tough product. Similarly, drying very rapidly at temperatures above 100 deg. C. (212 deg. F.) results in a hard, dense wafer. The high whipping property of the skim milk mix is not obtainable with potato alone, for it is the skim milk which is largely responsible for building up the volume and strength of the whip. The drying of plain whipped potato produces a hard, horny substance which is hardly edible. Fats and oils destroy the whipping properties of potato-skim milk mixtures, their presence producing a hard, dense wafer.

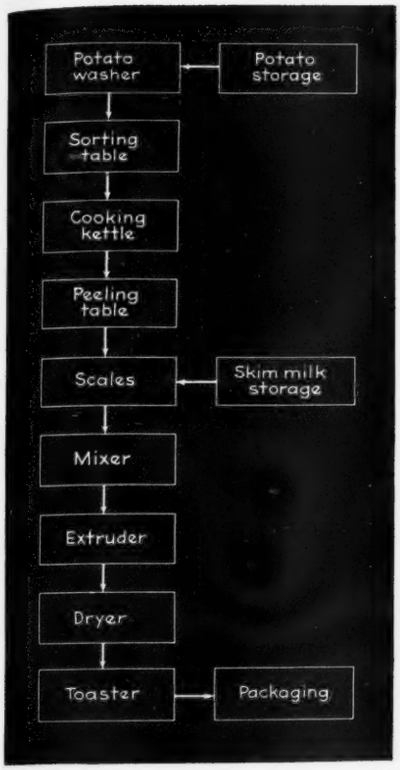
Table I—Formula for Potato-Skim Milk Wafers

Ingredients	Weights (grams or lb.)	Weights of solids (grams or lb.)	Composition on a dry basis Per cent
Peeled, boiled potatoes.	800	180	65.4
Skim milk solids.....	80	80	29.1
Water and flavoring...	200	....	....
Salt (pepper to taste).	15	15	5.5

Table II—Quantities and Approximate Costs of Ingredients Necessary to Make a 5-Lb. Batch of Potato Wafers

Ingredients	Lb.	Approximate cost of ingredients
Peeled, boiled potatoes....	14.32	$.159
Skim milk solids.....	1.43	.100
Water	3.58	
Salt, pepper	.27	.002
	19.60	$.261
Weight of dry, finished wafers	5.0	
Cost of ingredients, per lb.		$.052

* The essential features of the process described herein are disclosed in U. S. Patent No. 2,185,451 granted to the author January 2, 1940, and dedicated to the free use of the people in the territory of the United States. In this patent a drying temperature of 130 deg. C. (266 deg. F.) was recommended. The work on which this temperature was based was done on an improvised drier in which the heat was very unevenly distributed. A new drier with uniform heat distribution has shown that the optimum drying temperature is 85 deg. C. (185 deg. F.) to 95 deg. C. (203 deg. F.)



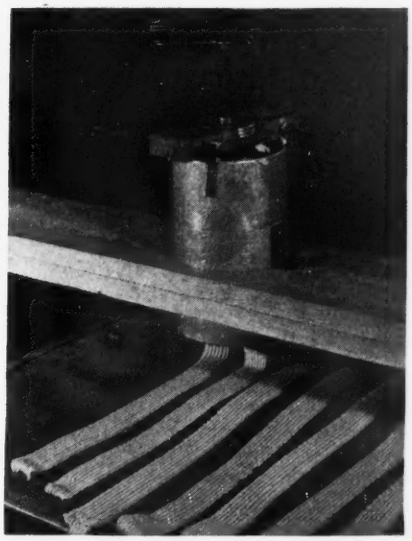
Flow diagram showing steps in the production of potato-skim milk wafers.

The whipped mix is extruded through a nozzle of any desired shape using either air pressure or a mechanical screw type plunger to force the product from the extruder. Ribbons of mix are deposited on moving screening, the mesh of which may be varied from 4 to 24 strands to the inch. Screening allows drying on the upper and lower surfaces of the product and greatly accelerates this operation. Screens constructed of stainless steel or aluminum are satisfactory, but copper and bronze stain the wafers. It is best to score the ribbons of mix after they are deposited on the screening in order to facilitate breaking the dry product into wafers of uniform length.

The rate or temperature of drying influences texture. Drying at temperatures above 100 deg. C. (212 deg. F.) adversely affects texture by collapsing the air cells and producing a dense product. A similar result is experienced when the drying temperature is too low, such as 60 deg. C (140 deg. F.) or less. Optimum drying conditions obtain when a temperature of 85 deg. C. (185 deg. F.) for 50 to 60 min. is used, although good results can be obtained when temperatures of about 70 deg. C. (158 deg. F.) to 95 deg. C. (203 deg. F.) are used. Some of the exhaust air from the drying tunnel may be returned, but to avoid prolongation of the drying time the air should not be allowed to become excessively moist. The dryer used in this experimental work was operated by a fan forcing air over steam coils and through the tunnel.

In the experimental work, the wafers were dried on screen trays. This method could be used on a commercial scale but some handling would be eliminated by drying the product on an endless screen belt and synchronizing the rate of extrusion, the speed of the belt, and the rate of drying.

The dry wafer is a potato white. Toasting improves its flavor and leaves it with an attractive brown color for which the skim milk is responsible. The toasting operation may be carried out through the use of gas or electric heating elements.



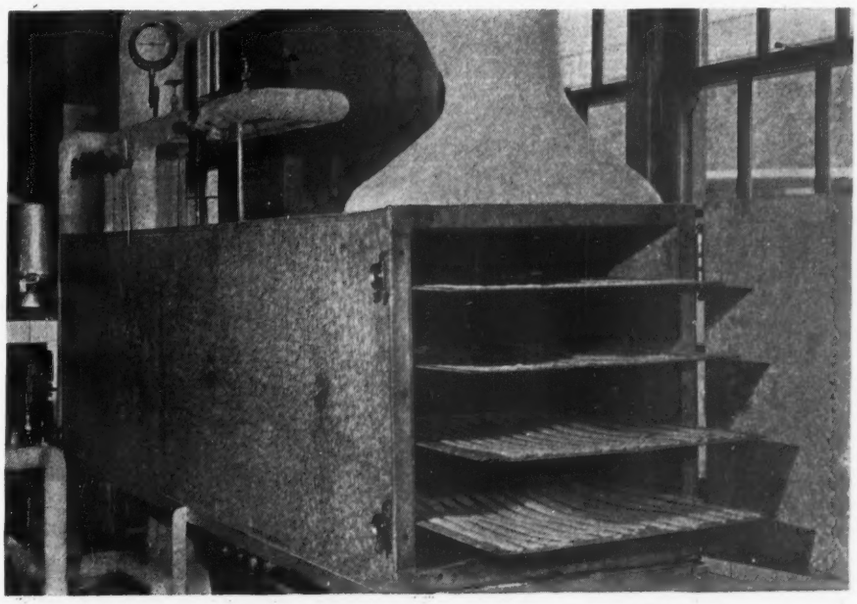
After whipping, the wafers are formed by extruding the mix through a nozzle of any desired shape. The extruded wafers are deposited upon a screen tray or a belt of fine-mesh screening, in order to permit rapid, uniform drying.

Packaging presents no unusual difficulties since the only requirement is a moisture-proof container. Potato-skim milk wafers absorb moisture slowly, just as do crackers and other wafers. Tightly closed cellophane bags, lined paper bags or cans are suitable containers.

Wafers of different flavors were made. The plain wafers were characterized by a slight cheese flavor derived from the casein of the skim milk. Ground, cooked vegetables, such as spinach, carrots and peas, were added to the whipped mix before it was extruded onto trays. These flavors in the dry wafers were not outstanding and would probably find use only as health foods. Some wafers were coated with a commercial cheese flavor which was not susceptible to randicity. Such a product was very pleasing to some individuals.

Acknowledgment

The desirability, from an economic and nutritional point of view, of combining skim milk and potatoes into palatable food products was originally suggested to the author by Dr. L. A. Rogers, chief, Division of Dairy Research Laboratories, Bureau of Dairy Industry. During the development of this product, Dr. Rogers made many helpful suggestions. Much of the manufacturing work was carried out by C. F. Hufnagel of the laboratory staff.



When trays are used, drying is carried out in a hand-loaded cabinet dryer, but for larger production a traveling belt in a drying tunnel is recommended.

How Foods Are Frozen In the Northwest

Operating practices and plant equipment

Part II

By F. W. KNOWLES

Manager,
Northwest Baker Ice Machine Co.,
Seattle, Wash.

ASIDE from the work done at Hillsboro by Birds Eye, the development of vegetable freezing in Oregon was comparatively slow. Robert Ireland, owner of Terminal Ice & Cold Storage Co., Portland, however, spent a great deal of time in an effort to develop a method of freezing vegetables and berries (in particular, strawberries) so as to have a better product after thawing. Mr. Ireland's plant at Hillsboro, installed to handle Birds Eye's frozen pack, offered a good opportunity for experiment. And considerable development took place in 1938 with a tunnel type freezer having a belt made of narrow pieces of flat steel riveted to link type chains. The belt was not entirely successful, and some changes were made for the 1939 season.

A large amount of the R. D. Bodle Co.'s pack has always been frozen in plants other than its own, partly due to lack of room and partly from a desire to keep freezing operations separate from canning operations.

In 1936, City Ice & Cold Storage Co., Seattle, set up a plant to handle part of the Bodle frozen pack (see Fig. 3). This plant had somewhat of a new method for handling trays. A bunker of galvanized finned coils, of a type similar to those described earlier in this article, was installed. This

This report on

QUICK FREEZING

Is of value to processors of

Fruits, Vegetables, Meats, Fish and Poultry

Because it describes the operations of the great food freezing industry of the Northwest. Practical operating information, data and drawings on the methods and equipment used are presented in the form of case histories.—The Editors.

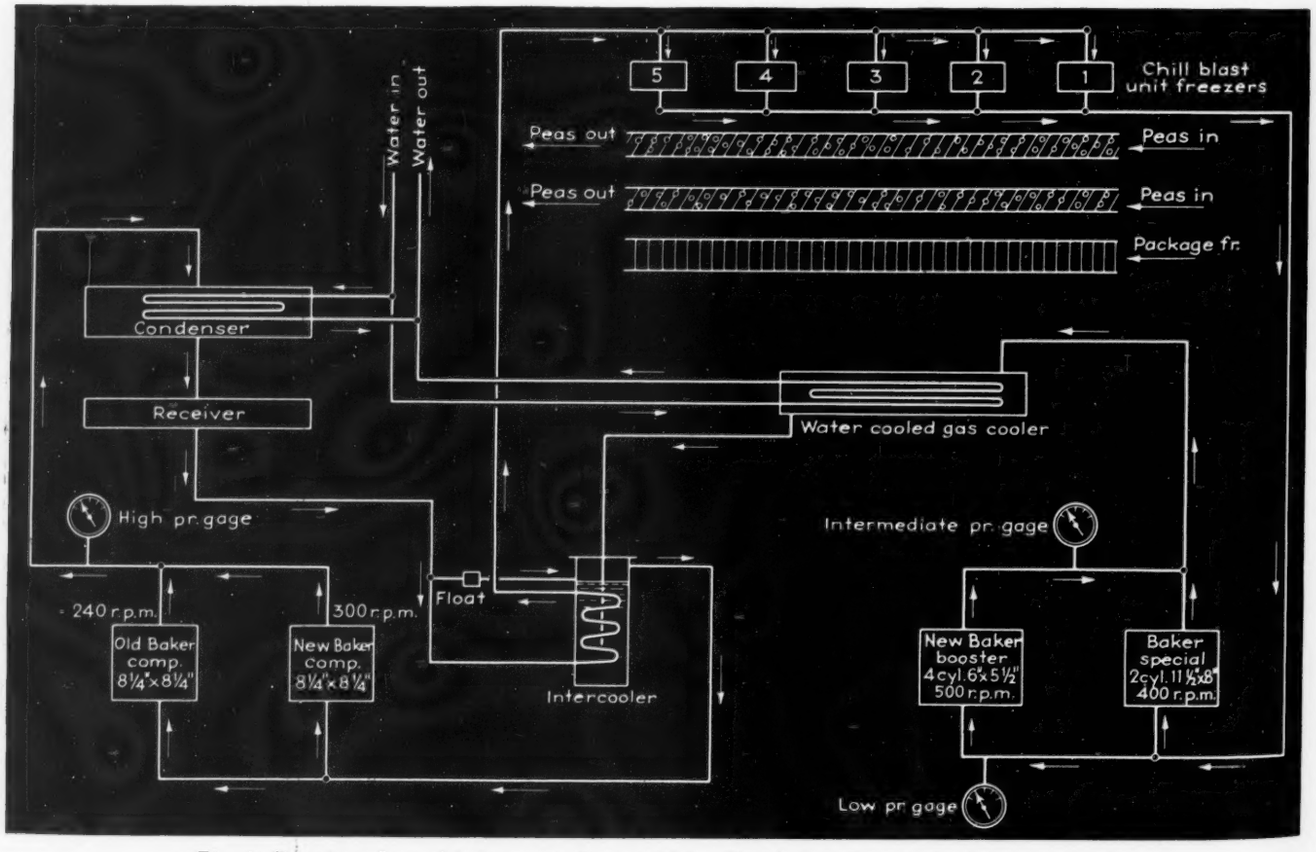


Fig. 4—Freezing plant of belt type built in 1938 by Washington Frosted Foods, Inc., Seattle, to handle two tons an hour. Belts and ammonia system are shown schematically.

coil has 4,200 sq.ft. of finned surface and is completely flooded. It is connected to a 10x10 in., two cylinder compressor with a 100 hp. motor and has a 30,000 c.f.m. fan driven by a 20 hp. motor, making a total of 120 hp. The fin coil is divided into two sections, each section arranged to operate separately if desired. All operating valves are housed in the accumulator area between the two sections of the finned coil.

Doors are arranged on each coil section so that all or part of the air from the fan can be put through either coil section. Air is passed through the coils and through the tray bearing trucks in the area in front of the coils, then sweeps up overhead and is returned to the fan through a broad duct arranged to bring the air back from the ends of the trays.

Due to lack of space, it wasn't possible to arrange the bakery type trucks handling the trays to the best advantage. Trucks were loaded and taken into the freezing chamber through an air lock at the end farthest from the coils. The intention was that these bakery type trucks, loaded with about 400 lb. of produce, would pass progressively into colder air as they neared the outlet and would then leave the freezing chambers through another air lock, to be dumped and passed back for another load of produce. This operation was followed reasonably well. However, a great deal of crossing back and forth with loaded and empty trays is necessary because of the small space in which the cannery operation is placed.

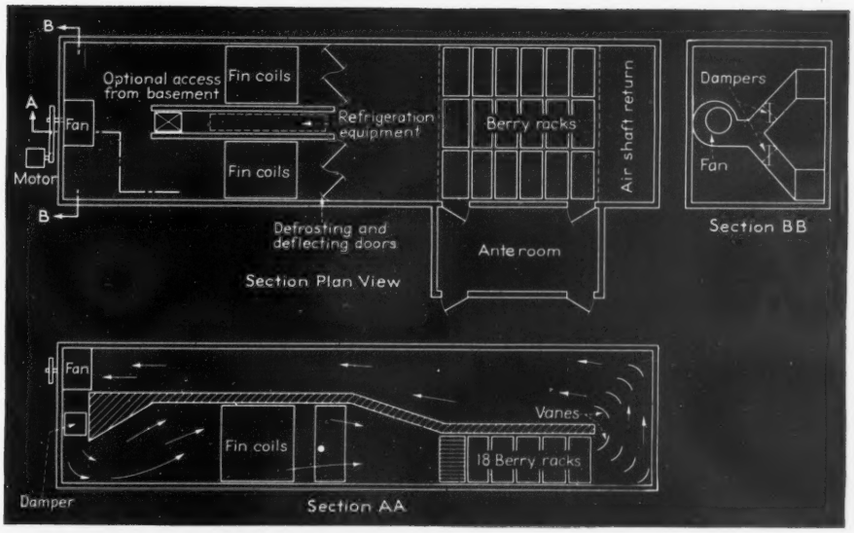
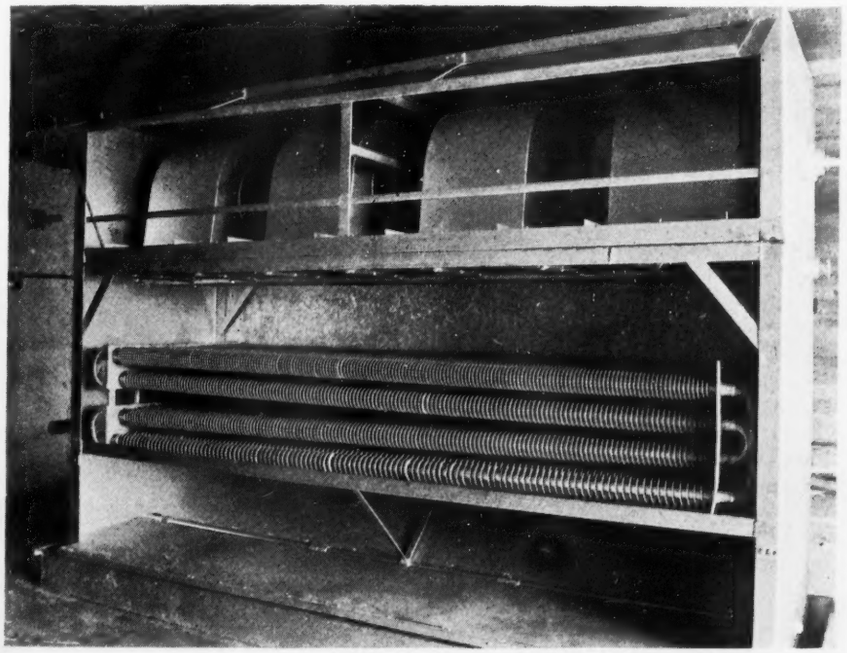


Fig. 3—This freezing plant was set up by City Ice & Cold Storage Co., Seattle, in 1936 to handle part of the Bodle frozen pack. The plant has something new in the way of tray handling facilities.



Interior of chill blast unit installed by Washington Frosted Foods, Inc., Seattle. Four fans blow air over a bank of finned coils.

No blanching is done in this plant, but a great deal of rearranging, sorting and cleaning of the produce, mostly peas and berries, takes place, and the operation of putting the peas on the trays is rather expensive. This plant has operated without changes for three seasons, freezing up to 30 tons daily. It has operated over a great many months each year, generally starting at the first of the berry season, or even as early as the asparagus season in April, and carrying through until after the holidays, freezing turkeys. One year, close to 600 tons of turkeys was frozen, at the rate of 30 tons per day, for the Washington Cooperative Egg & Poultry Association. At times, when operations were heavy, the entire truck area has been filled with the various foodstuffs to be frozen. Peas, raspberries, turkeys and other produce were simply left there until frozen, generally overnight. When this type of operation is carried on, bakery trucks are not used.

The adaptability of this type construction has fitted in very well with the particular type of freezing being done by the owners. About 40 trucks are in use during the operating season, each carrying 10 trays, 20 to 40 lb. per tray—some more than this during the heavy freezing season.

Defrosting these particular coils is done by hot gas. Half of the coil section is shut off and doors leading into the truck area are closed. Then hot gas from the discharge line is bypassed through the coils (in at the top and out at the bottom). The return line leads the condensed liquid back to a connection into the receiver.

To some refrigeration minded people, this may sound like a peculiar method of defrosting. However, it is very successful. In particular, it prevents the condensed liquid, or any oil or other sludge from the coils, from passing into the suction line, as happens with other types of defrosting systems where condensate is returned to the suction line. While the arrangement puts condensing pressure on the coils, the entire coil arrangement is constructed to accommodate this pressure. All expansion is in straight lines; line lengths are

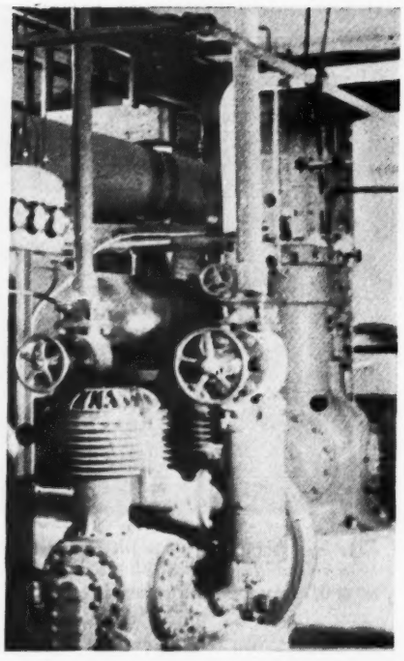
sufficient to permit whatever expansion may occur while defrosting. Defrosting, taken care of as it should be each four hours, is extremely rapid. Thirty minutes generally is ample to clear each section and have it back in operation. This is generally done during the rest period for the cannery operating crew.

A single-stage 10x10 in. compressor, operating at 300 r.p.m. from a 100 hp. motor, is installed on this tray freezing system, together with a 20 hp. fan, a total of 120 hp. Twenty-four to 30 tons of produce is frozen daily during the season.

THE Frost Sealed Packing Co. started operations in 1937 with a single 80 ft. belt, 5 ft. wide. The builder of this plant had had a great deal of experience as an erecting engineer and operating engineer in quick freezing plants over the last several years, and he used this experience to good advantage in the construction of this last plant.

This plant is equipped with finned type coils, placed horizontally with vertical headers fed from a float controlled accumulator of the cooling coil type. The defrosting arrangement in this plant was originally to be handled by an extra receiver, in which it was planned to maintain another full charge of liquid ammonia. The idea was to drain the coils of the very cold ammonia on which the plant had been operating, then charge the coils again with the warm ammonia from this second receiver. The second or auxiliary receiver was placed outside the engine room with necessary drain connections for draining and refilling of the coils. In actual practice, however, insufficient heat was introduced by the returning warm ammonia to melt the frost accumulation on the coils, so hot gas from the discharge line had to be piped into the finned coils and returned into the suction of the compressor. By throttling down the stop valve on the coils and building up a slight pressure, defrosting is done reasonably fast and conveniently.

This tunnel has about 4,500 sq.ft. of galvanized finned surface and is equipped with a 60,000 c.f.m. fan, driven by a 20 hp. motor. Air is delivered at extremely high velocity under the belt at the entry end and through to the peas. Sufficient velocity is employed to keep the peas jumping from the belt at this point. This is to prevent peas from freezing to the belt until glazed. Farther along the belt's length, as the peas either become glazed or give up their free moisture to the air, the velocity of the air under the belt is reduced



Thirty ton booster (foreground) and second-stage compressor.

to normal. After passing around the peas, the air is carried up into an overhead duct and returned to the fan. Then it is again driven through the coils.

A 100 hp. 10x10 in. compressor, a 20 hp. 5x5 in. compressor and a 20 hp. motor on the fan make a total of 140 hp. used in this plant. Originally designed for one ton of peas per hour, the plant performed in a highly satisfactory manner, the owners stating that one ton per hour could be frozen without difficulty.

The belt used on the Frosted Seal plant is very similar to other belts used throughout the territory. Every effort was expended, however, in an attempt to make it run flat and to prevent the peas from rolling to the center, as is the case with belts that have a tendency to sag. This plant does a great deal of freezing for the Frost Kraft Co. and has a reputation for turning out a fine pack.

THE Washington Frosted Food plant, under the active management of William Cahill, had the benefit of his many years of experience in quick freezing vegetables and fruits to aid in its design. Built in 1938 and intended to freeze two tons hourly on belts, it is equipped with complete two-stage refrigeration machinery. One 25 hp. booster, one 40 hp. booster and one 60 hp. 8¼x8¼ in. compressor (second-stage machine), aided by an old style 30 hp. 8¼x8¼ in. compressor on the second stage, make a total of 155 hp. in the engine room. It has in addition, five 5 and 7½ hp. brine, defrosting type, chill blast air units, making a total of 185 hp.

The five chill blast units are installed in a row along the belts. The belts are 4 ft. wide and 80 ft. long and are each arranged with an individual drive. A package freezer tunnel parallels the belts. These two tunnels are arranged so that any one or all of the chill blast units can be diverted onto either set of belts or onto the package freezer tunnel. Air is delivered through these chill blast units downward, with a hinged deflector at the bottom which allows the air to be directed either way desired.

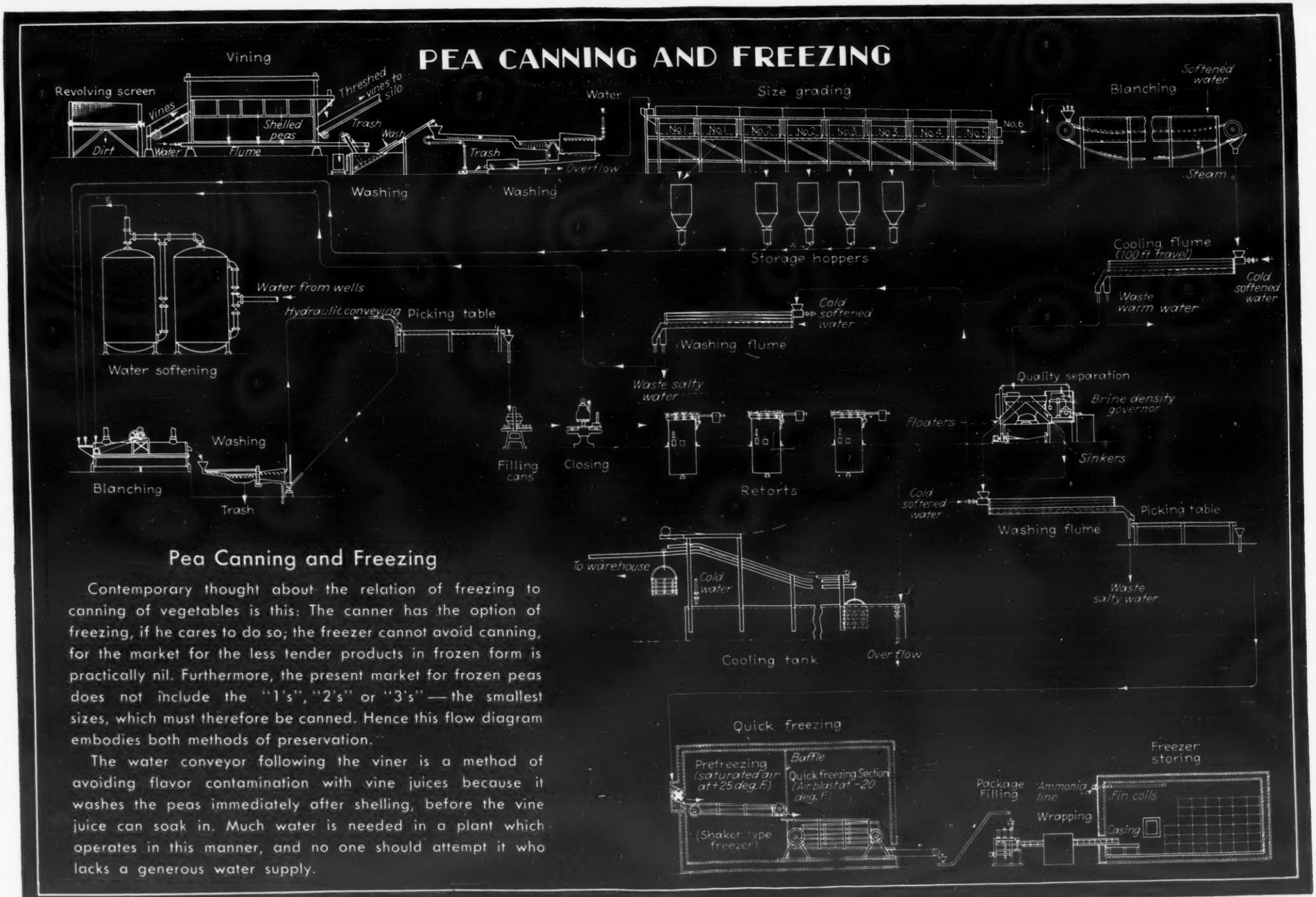
All cannery machinery is on the floor above the freezing equipment. The peas come in and are elevated up to the graders and pass through the various pieces of cannery equipment until they are delivered to the distributor, which feeds them onto the two belts, each belt being arranged with a variable speed drive. It is possible to regulate the speed of these belts to almost any rate desired. The belts are extremely well arranged, are tight and have not developed sagging of any sort. The peas are raked from these belts into little windrows near the end of the belt tunnel and fall free on being delivered from the tunnel into hoppers.

The five chill blast units are each arranged for warm brine defrosting. This is all handled from the engine room. A tank with a steam coil and with brine pump attached delivers the brine to the various units at any time desired. Ordinarily, these units are defrosted intermittently at least once each four hours.

The construction of the belts is a considerable improvement over any heretofore built. Made of small mesh hardware cloth, these belts roll over a large drum which holds the belt square and flat. No flowing together or sticking has been experienced. After passing over the belt and dropping into hoppers at the belt's end, the frozen produce, peas generally, is lead to the filling machinery on the floor below. The entire arrangement is compact, and the operating cost should be extremely low.

A peak of about 33 tons of peas daily was frozen last season. Due to a short crop, practically none of the canneries in this territory worked at extreme capacity. A sketch of the ammonia system is shown in Fig. 4.

Part III of this article, concluding the discussion of freezing methods in the Northwest, will be published in an early issue of FOOD INDUSTRIES.—*The Editors.*



Pea Canning and Freezing

Contemporary thought about the relation of freezing to canning of vegetables is this: The canner has the option of freezing, if he cares to do so; the freezer cannot avoid canning, for the market for the less tender products in frozen form is practically nil. Furthermore, the present market for frozen peas does not include the "1's", "2's" or "3's" — the smallest sizes, which must therefore be canned. Hence this flow diagram embodies both methods of preservation.

The water conveyor following the viner is a method of avoiding flavor contamination with vine juices because it washes the peas immediately after shelling, before the vine juice can soak in. Much water is needed in a plant which operates in this manner, and no one should attempt it who lacks a generous water supply.

These packaged cereal products of O'Brien Milling Co. are protected against insect infestation by electrical treatment.

Complete PRODUCT PROTECTION

Tested and Approved

Packaged cereal products made insect free to eliminate returns from dealers and improve consumer good will

By G. E. O'BRIEN
Vice-President, O'Brien Milling Co., Greenville, Ohio

INSECT-FREE packaged cereal preparations that insure us against returns from the trade are being produced with the aid of electrical treatment, called "entoletion." When we first installed the electrical treatment, we were determined to prove its actual value to us by continuous laboratory tests. These tests were made by taking samples of every product from each day's run. Half of the samples were taken from the production line after the electrical treatment, and duplicates were taken from the same production line but without the treatment. The purpose of the treatment was, of course, to sterilize the packaged cereal products and thereby prevent the growth of any insects or eggs that might possibly be present.

Comparative tests are necessary because it is true that not every package is infested. As a matter of fact, it is only a small percentage of the total production that is actively infested, but the occasional "buggy" package that reaches the consumer usually comes right back to the manufacturer through the dealer. Yet despite any manufacturer's ready willingness to replace the goods, experience shows that a considerable amount of dealer good will has been lost and that he is reluctant to reorder the same line of goods after he has experienced even a very small number of consumer complaints. The loss of consumer good will is even greater and more hazardous.

There are several ways of meeting the problem of insect infestation. The least technical method of solving the problem merely increases the cost of distribution and selling. This method is to secure a very rapid turnover of stocks in dealers' hands. But, to maintain this needed rapidity of turnover requires closer supervision of dealers' stocks, more frequent calls and often smaller units of sale. All of this costs money and by its very nature is uneconomic because it is unnecessary. Another way is product fumigation by chemical treatment. A third way is by heat treatment of the product (if it will withstand it) followed by careful packaging. And a fourth way is by electrical treatment.

If a product is properly packaged so that insects cannot get in from the outside, and if it is free from all insects when it leaves the factory, then it should possess a shelf life that is dependent only on possible chemical deterioration or flavor changes. In other words, its merchantable life is almost indefinite from any practical economic viewpoint. Such a condition will permit the most economic form of distribution that is possible: less frequent supervision of stocks in dealers' hands, larger units of sale and a lowered selling cost.

On the basis of the foregoing analysis we adopted the plan of complete product protection by electrical treatment in the Entoleter so that the money otherwise spent in watching retailers' stocks over a wide area could be better spent in sales promotion. Here it would do some real tangible

This article on

QUALITY CONTROL

Is of interest to

Packers of Dry Packaged Foods Flour Millers

Because it gives extensive test data on the effectiveness of electrical treatment to rid the product of insects and larvae.—The Editors.

good instead of accomplishing the negative feature of trying to avoid trouble by outguessing the insects that normally infest almost every dry cereal product.

In substantiation of the dealer attitude toward infested products, I cite a few figures that were assembled by Entoleter Co., Inc., comprising a summary of 539 questionnaire returns from wholesale or jobbing outlets. Approximately one-fourth of them report that retailers are reluctant to accept the same brand for replacement of returned infested goods. (Out of 485 who replied, 113 admitted this retailer reluctance.) Worse yet, 11½ per cent out of 449 actually refuse replacement by the same brand.

How some jobbers attempt to control the insect infestation problem in warm months is shown by the fact that out of 508 replies, 154 (about one-third) refuse to stock certain items in hot weather, and that 103 jobbers cut down the size of the stocks.

Any benefits that can accrue to a manufacturer who can insure immunity of his products from infestation must necessarily be found in lowered selling costs. He cannot obtain higher prices merely because of his guarantee, and any form of treatment in his plant, be it fumigation or electrical treatment, will involve a slight addition to regular manufacturing costs.

Quality control supervision in this direction is, in reality, an effort to find something one does not wish to find. The cost of treatment is small, but the cost of failure—of inadequate treatment—could easily become an important item. Hence there is great need for close laboratory supervision of manufacturing operations.

What has been achieved? Probably the monthly laboratory results for an entire year are the best answer. Incubation tests at 92 deg. F. for one month were made in order to accelerate the growth of any live insects or eggs in the packages. Otherwise, many months of waiting would necessarily have elapsed. After incubation, a painstaking search was made through the entire contents of each test package to find any bugs. Then it was necessary to find out if they were alive or dead, particularly because dead insects do not multiply, whereas live ones are likely to develop into a family of notable size.

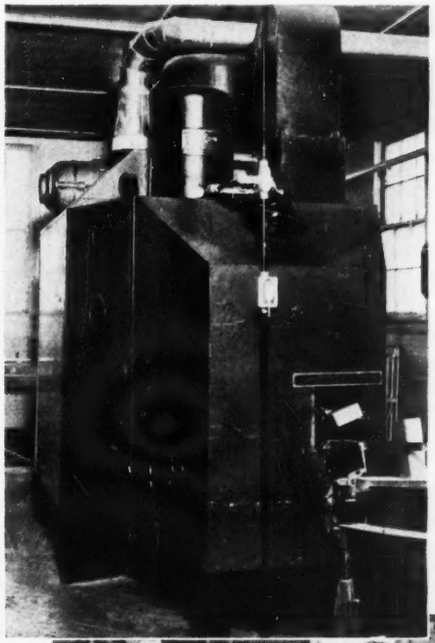
While, in the interest of logic, it is necessary to show that living insects were present before treatment and that they were dead afterwards, the food manufacturer's interest is found only in the final result of a factory production that is free from live insects or eggs. That highly desirable condition is potent knowledge for the sales department.

A table of results condensed from the laboratory reports of H. Vernon of our company shows the magnitude of the potential problem and how it has been prevented from becoming an actual problem.

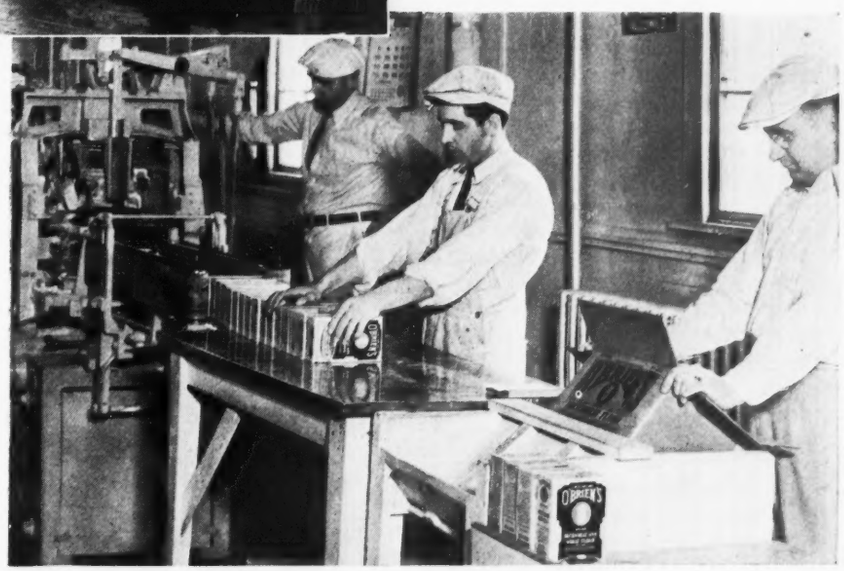
From the tabulation it is evident that approximately 20 per cent of the untreated samples developed insects after the incubation period. On the other hand, only one live insect was discovered in any treated sample in a period of something more than a year of detailed study. Our experience indicates that the electrical treatment is doing exactly what is needed, namely producing insect free packaged cereal preparations and protecting us against returns from the trade.

(*Turn to next page for data on tests.*)

These girls are putting flour into cartons which will be sealed, passed through the Entoleter to kill any insects that might be present and then tight-wrapped.



Insect-free packages of prepared flour being discharged from Entoleter. The packages enter the machine after top-sealing and are conveyed through a zone of high frequency, high potential electric corona on motor driven glass rollers. The corona discharge from electrodes penetrates the packages, killing all forms of insect life.



When these packages go to the trade they will not be returned because of insect infestation. Before being tight-wrapped with the printed paper cover, in the machine shown here, the cartons were passed through the Entoleter, shown in another picture.

INCUBATOR REPORT

(In each test two packages were taken from the production line, one treated by the Entoleter and one untreated.)

OCTOBER, 1938

Date pkgd.	Exam-ined	Prod-uct	Size lb.	Treated	Untreated
9-1	10-1	CC	1¼	O.K.	1 live B.
9-1	10-1	BW	1¼	O.K.	1 live B.
9-1	10-1	PC	1¼	O.K.	O.K.
9-2	10-1	PC	1¼	O.K.	O.K.
9-2	10-1	C	1¼	O.K.	1 live B.
9-6	10-6	PC	1¼	O.K.	1 live B.
9-6	10-6	PC	1¼	O.K.	O.K.
9-7	10-7	PC	1¼	O.K.	O.K.
9-7	10-7	BW	1¼	O.K.	O.K.
9-7	10-7	BW	1¼	O.K.	O.K.
9-8	10-8	PC	1¼	O.K.	O.K.
9-8	10-8	PC	1¼	O.K.	O.K.
9-9	10-8	PC	1¼	O.K.	O.K.
9-9	10-8	PC	1¼	O.K.	O.K.
9-9	10-8	BW	3½	O.K.	O.K.
9-12	10-12	PC	1¼	O.K.	O.K.
9-12	10-12	PC	1¼	O.K.	O.K.
9-15	10-15	B	1¼	O.K.	O.K.
9-15	10-15	CC	1¼	O.K.	O.K.
9-16	10-15	BW	1¼	O.K.	1 live B.
9-16	10-15	BW	3½	O.K.	O.K.
9-17	10-17	BW	5	2 dead B.	4 live B.
9-17	10-17	BW	3½	O.K.	O.K.
9-17	10-17	PC	3½	O.K.	O.K.
9-18	10-18	PC	3½	O.K.	O.K.
9-18	10-18	BW	3½	O.K.	O.K.
9-20	10-20	BW	1¼	O.K.	O.K.
9-20	10-20	PC	1¼	O.K.	O.K.
9-20	10-20	CC	1¼	O.K.	O.K.
9-20	10-20	PC	3½	O.K.	O.K.
9-20	10-20	PC	3½	O.K.	O.K.
9-20	10-20	BW	3½	O.K.	O.K.
9-21	10-21	CC	1¼	O.K.	O.K.
9-21	10-20	BW	3½	O.K.	O.K.
9-22	10-22	CE	1¼	O.K.	O.K.
9-22	10-22	PC	1¼	O.K.	O.K.
9-23	10-22	BW	1¼	O.K.	O.K.
9-24	10-24	PC	1¼	O.K.	O.K.
9-24	10-24	PC	1¼	1 dead B.	O.K.
9-24	10-24	GM	3	O.K.	O.K.
9-24	10-24	BW	3½	O.K.	O.K.
9-24	10-24	PC	3½	O.K.	O.K.
9-26	10-26	GM	3	O.K.	O.K.
9-26	10-26	PC	1½	O.K.	O.K.
9-27	10-26	PC	3½	O.K.	O.K.
9-27	10-26	PC	1½	O.K.	O.K.
9-27	10-26	PC	1½	O.K.	O.K.
9-30	10-31	PC	3½	O.K.	O.K.
9-30	10-31	BW	1¼	O.K.	O.K.

NOVEMBER, 1938

10-2	11-2	BW	3½	O.K.	1 live B.
10-2	11-2	PC	3½	O.K.	35 live B.
10-3	11-3	BW	3½	O.K.	2 live B.
10-3	11-3	PC	1¼	O.K.	7 live B.
10-3	11-3	PC	1¼	O.K.	O.K.
10-3	11-3	BW	1¼	O.K.	1 live B.
10-5	11-5	GM	3	O.K.	O.K.
10-5	11-5	BW	5	3 dead B.	1 live B.
10-6	11-5	C	4	O.K.	O.K.
10-6	11-5	BW	3½	O.K.	3 live B.
10-7	11-7	BW	3½	O.K.	O.K.
10-7	11-7	PC	1¼	O.K.	O.K.
10-7	11-7	PC	1¼	O.K.	1 live B.
10-7	11-7	C	1¼	O.K.	O.K.
10-13	11-12	BW	1¼	O.K.	O.K.
10-14	11-14	PC	3½	O.K.	O.K.
10-15	11-14	PC	1¼	O.K.	O.K.
10-15	11-14	CC	1¼	O.K.	O.K.
10-16	11-16	PC	3½	O.K.	O.K.
10-16	11-16	GM	3	O.K.	O.K.
10-17	11-17	PC	1¼	O.K.	O.K.
10-17	11-17	PC	1¼	O.K.	O.K.
10-18	11-18	PC	1¼	O.K.	O.K.
10-18	11-18	PC	1¼	O.K.	O.K.
10-18	11-18	BW	1¼	O.K.	1 live B.
10-19	11-19	BW	1¼	O.K.	O.K.
10-19	11-19	BW	1¼	O.K.	O.K.
10-19	11-19	CE	1¼	O.K.	O.K.
10-20	11-20	PC	1¼	O.K.	O.K.
10-20	11-19	PC	1¼	O.K.	O.K.
10-20	11-19	PC	1¼	O.K.	O.K.
10-20	11-19	BW	3½	1 live B.	40 live B.
10-21	11-21	PC	1¼	O.K.	O.K.
10-22	11-22	PC	3½	O.K.	O.K.
10-22	11-22	PC	3½	O.K.	O.K.
10-22	11-22	GM	3	O.K.	O.K.
10-25	11-25	CC	1¼	O.K.	O.K.
10-27	11-26	GM	3	O.K.	O.K.
10-27	11-26	PC	3½	O.K.	O.K.
10-27	11-26	BW	3½	O.K.	4 live B.
10-29	11-29	CE	2	O.K.	O.K.
10-29	11-29	B	5	O.K.	O.K.

DECEMBER, 1938

11-1	12-1	PC	1¼	O.K.	1 live B. 3 live L.
11-1	12-1	PC	1¼	O.K.	O.K.
11-1	12-1	BW	1¼	O.K.	O.K.
11-1	12-1	BW	1¼	O.K.	1 live B.
11-3	12-3	C	1¼	O.K.	O.K.
11-7	12-7	PC	1¼	O.K.	O.K.
11-7	12-7	PC	1¼	O.K.	O.K.
11-7	12-7	PC	3½	O.K.	O.K.
11-8	12-8	PC	1¼	O.K.	O.K.
11-8	12-8	PC	1¼	O.K.	O.K.
11-8	12-8	B	1¼	O.K.	O.K.
11-8	12-8	PC	3½	O.K.	O.K.
11-8	12-8	BW	3½	O.K.	2 live B.
11-10	12-10	GM	3	O.K.	O.K.
11-11	12-10	PC	3½	O.K.	O.K.
11-11	12-10	BW	3½	O.K.	O.K.
11-11	12-10	CE	1¼	O.K.	O.K.
11-11	12-10	BW	5	O.K.	3 live B.
11-12	12-12	PC	3½	O.K.	O.K.
11-12	12-12	BW	3½	O.K.	2 live B.
11-12	12-12	PC	3½	O.K.	O.K.
11-19	12-19	PC	3½	O.K.	O.K.
11-21	12-21	BW	1¼	O.K.	1 live B. 7 live L.
11-22	12-22	BW	1¼	O.K.	O.K.
11-23	12-23	BW	3½	O.K.	1 live B.
11-23	12-23	PC	3½	O.K.	O.K.
11-23	12-23	PC	3½	O.K.	O.K.
11-25	12-23	PC	1¼	O.K.	O.K.
11-25	12-23	PC	1¼	O.K.	1 live B.
11-28	12-28	PC	1¼	O.K.	O.K.
11-29	12-29	BW	1¼	O.K.	O.K.
11-29	12-29	C	1¼	O.K.	O.K.
11-29	12-29	CE	1¼	O.K.	O.K.
11-29	12-29	PC	3½	O.K.	O.K.

JANUARY, 1939

12-1	1-3	PC	1¼	O.K.	2 live B.
12-2	1-3	PC	3½	O.K.	O.K.
12-2	1-3	BW	3½	O.K.	1 live B.
12-2	1-3	BW	3½	O.K.	O.K.
12-6	1-6	PC	1¼	O.K.	2 live B.
12-6	1-6	PC	1¼	O.K.	O.K.
12-7	1-7	PC	1¼	O.K.	1 live B.

Condensed Report on Incubation Tests

In each test two packages were taken from the production line. One was untreated; the other was treated by the Entoleter. Both were then incubated for a month and then carefully examined for insects.

LEGEND

CC = Corn cake flour; BW = Buckwheat flour;
PC = Pancake flour; GM = Graham flour;
C = Cake flour; B = Biscuit flour;
CE = Cereal. CM = Corn meal.
Dead B. = dead beetles; live B. = live beetles;
live L. = live larvae.

JANUARY, 1939 (Cont'd)

Date pkgd.	Exam-ined	Prod-uct	Size lb.	Treated	Untreated
12-8	1-7	PC	1¼	O.K.	O.K.
12-8	1-7	PC	1¼	O.K.	O.K.
12-9	1-9	PC	1¼	O.K.	O.K.
12-9	1-9	CC	1¼	O.K.	O.K.
12-14	1-14	PC	3½	O.K.	O.K.
12-14	1-14	BW	3½	O.K.	O.K.
12-14	1-14	BW	3½	O.K.	3 live B.
12-15	1-14	PC	3½	O.K.	O.K.
12-16	1-16	PC	1¼	O.K.	O.K.
12-17	1-17	PC	3½	O.K.	O.K.
12-17	1-17	BW	5	O.K.	O.K.
12-17	1-17	GM	3	O.K.	O.K.
12-21	1-21	PC	1¼	O.K.	5 live B. 15 live L.
12-22	1-23	PC	1¼	O.K.	O.K.
12-23	1-23	PC	1¼	O.K.	O.K.
12-24	1-23	PC	3½	O.K.	O.K.
12-24	1-23	PC	3½	O.K.	O.K.
12-30	1-30	PC	1¼	O.K.	O.K.

FEBRUARY, 1939

1-5	2-6	PC	1¼	O.K.	O.K.
1-6	2-6	BW	3½	1 dead B.	1 dead B.
1-6	2-6	BW	5	O.K.	O.K.
1-6	2-6	PC	1¼	O.K.	O.K.
1-6	2-6	PC	1¼	O.K.	O.K.
1-9	2-9	BW	3½	O.K.	O.K.
1-9	2-9	BW	5	O.K.	O.K.
1-12	2-13	BW	3½	O.K.	O.K.
1-14	2-14	C	4	O.K.	O.K.
1-14	2-14	BW	3½	O.K.	O.K.
1-14	2-14	PC	3½	O.K.	O.K.
1-16	2-16	PC	1¼	O.K.	O.K.
1-16	2-16	B	1¼	O.K.	O.K
1-17	2-17	PC	1¼	O.K.	15 live L.
1-17	2-17	PC	1¼	O.K.	O.K.
1-18	2-18	PC	1¼	O.K.	O.K.
1-19	2-18	PC	1¼	O.K.	O.K.
1-19	2-18	PC	1¼	O.K.	O.K.
1-19	2-18	BW	1¼	O.K.	O.K.
1-20	2-20	PC	1¼	O.K.	1 live B. 2 live L.
1-20	2-20	CE	1¼	O.K.	O.K.
1-24	2-24	BW	5	O.K.	O.K.
1-24	2-24	GM	3	O.K.	O.K.
1-28	2-28	BW	3½	O.K.	1 live L.
1-30	2-28	PC	1¼	O.K.	O.K.
1-31	2-28	PC	1¼	O.K.	O.K.
1-31	2-28	PC	1¼	O.K.	O.K.
1-20	2-20	PC	1¼	O.K.	O.K.

MARCH, 1939

2-2	3-18	PC	1¼	O.K.	O.K.
2-2	3-18	PC	1¼	O.K.	O.K.
2-3	3-18	PC	1¼	O.K.	O.K.
2-3	3-18	PC	1¼	O.K.	2 live B. 50 live L.
2-3	3-18	PC	1¼	O.K.	O.K.
2-4	3-18	PC	1¼	O.K.	O.K.
2-4	3-18	PC	1¼	O.K.	O.K.
2-5	3-18	PC	1¼	O.K.	O.K.
2-5	3-18	PC	1¼	O.K.	O.K.
2-6	3-18	PC	1¼	O.K.	O.K.
2-6	3-18	PC	1¼	O.K.	1 live B.
2-8	3-18	PC	1¼	O.K.	O.K.
2-8	3-18	PC	1¼	O.K.	O.K.
2-9	3-18	PC	3½	O.K.	50 live B. 175 live L.
2-9	3-18	BW	5	O.K.	2 live B.
2-9	3-18	GM	3	O.K.	O.K.
2-15	3-18	BW	1¼	O.K.	O.K.
2-17	3-18	BW	3½	O.K.	4 live B. 25 live L.
2-16	3-18	BW	1¼	O.K.	O.K.
2-18	3-18	PC	1¼	O.K.	O.K.
2-16	3-18	PC	1¼	O.K.	O.K.
2-17	3-18	PC	1¼	O.K.	O.K.

APRIL, 1939

3-3	4-4	C	4	O.K.	O.K.
3-3	4-4	BW	5	O.K.	3 live B.
3-3	4-4	GM	3	O.K.	O.K.
3-15	4-15	PC	1¼	O.K.	O.K.
3-21	4-21	PC	1¼	O.K.	O.K.
3-22	4-22	PC	1¼	O.K.	O.K.
3-22	4-22	BW	1¼	O.K.	O.K.

MAY, 1939

4-14	5-15	PC	1¼	O.K.	4 live B. 1 live L.
4-14	5-15	BW	1¼	O.K.	6 live B. 7 live L.
4-14	5-15	CC	1¼	O.K.	O.K.
4-19	5-19	PC	3½	O.K.	O.K.
4-19	5-19	BW	3½	O.K.	O.K.
4-21	5-19	C	4	O.K.	O.K.
4-21	5-19	BW	3½	O.K.	15 live B. 40 live L.
4-21	5-19	PC	3½	O.K.	O.K.

JUNE, 1939

5-1	6-1	PC	1¼	O.K.	25 live B. 100 live L.
5-2	6-2	PC	1¼	2 dead B.	35 live B. 75 live L.
5-2	6-2	BW	1¼	O.K.	10 live B. 50 live L.
5-5	6-5	BW	3½	1 dead B.	4 live B. 7 live L.
5-5	6-5	PC	3½	O.K.	2 live B. 2 live L.
5-3	6-3	BW	1¼	O.K.	1 live B.
5-3	6-3	CE	1¼	O.K.	O.K.
5-4	6-4	CE	1¼	O.K.	O.K.
5-4	6-3	C	1¼	O.K.	O.K.
5-4	6-3	CC	1¼	O.K.	O.K.
5-8	6-8	PC	1¼	O.K.	O.K.
5-16	6-16	PC	3½	O.K.	7 live B. 50 live L.
5-20	6-20	PC	3½	O.K.	O.K.
5-24	6-24	PC	3½	O.K.	O.K.
5-26	6-26	PC	3½	O.K.	O.K.
5-26	6-26	PC	3½	O.K.	O.K.

JULY, 1939

Date pkgd.	Exam-ined	Prod-uct	Size lb.	Treated	Untreated
6-7	7-7	PC	1¼	O.K.	25 live B. 150 live L.
6-8	7-8	PC	1¼	O.K.	10 live B. 100 live L.
6-12	7-12	BW	3½	O.K.	O.K.
6-13	7-13	PC	1¼	O.K.	O.K.
6-14	7-14	PC	1¼	O.K.	O.K.
6-15	7-15	PC	1¼	O.K.	7 live B. 50 live L.
6-15	7-15	BW	1¼	O.K.	O.K.
6-16	7-17	BW	1¼	O.K.	O.K.
6-17	7-17	BW	1¼	O.K.	O.K.
6-28	7-28	C	4	O.K.	O.K.

Note: On the evidence of the increasing intensity of infestation of samples of the untreated product, the entire mill was completely cleaned up and fumigated on July 4.

AUGUST, 1939

7-14	8-14	C	4	O.K.	O.K.
7-19	8-19	PC	3½	O.K.	O.K.
7-19	8-19	BW	3½	O.K.	O.K.
7-20	8-19	PC	3½	O.K.	O.K.
7-20	8-19	BW	3½	O.K.	O.K.

SEPTEMBER, 1939

8-11	9-11	PC	3½	O.K.	7 live B. 50 live L.
8-2	9-2	B	5	O.K.	O.K.
8-3	9-2	PC	3½	O.K.	1 live L.
8-3	9-2	BW	1¼	O.K.	O.K.
8-4	9-5	BW	1¼	O.K.	2 live L.
8-4	9-5	PC	1¼	O.K.	2 live L.
8-4	9-5	PC	1¼	O.K.	O.K.
8-5	9-5	PC	1¼	1 dead B.	4 live L.
8-7	9-7	PC	1¼	O.K.	9 live B.
8-8	9-8	PC	1¼	O.K.	1 live B. 2 live L.
8-8	9-8	PC	1¼	O.K.	1 live B.
8-8	9-8	PC	1¼	O.K.	1 live B.
8-9	9-9	PC	3½	O.K.	O.K.
8-11	9-11	PC	3½	O.K.	O.K.
8-14	9-14	PC	1¼	O.K.	1 live B. 7 live L.
8-14	9-14	PC	1¼	O.K.	2 live B.
8-15	9-15	PC	3½	O.K.	O.K.
8-15	9-15	BW	3½	O.K.	O.K.
8-16	9-16	C	2¾	O.K.	O.K.
8-18	9-18	C	2¾	O.K.	O.K.
8-22	9-22	C	2¾	O.K.	O.K.
8-23	9-23	C	2¾	O.K.	O.K.
8-24	9-23	C	2¾	O.K.	O.K.
8-22	9-22	C	1¼	O.K.	O.K.
8-24	9-23	B	1¼	O.K.	2 live L.
8-24	9-23	BW	3½	O.K.	3 live B.
8-25	9-25	PC	1¼	O.K.	O.K.
8-25	9-25	C	2¾	O.K.	O.K.
8-26	9-26	C	2¾	O.K.	O.K.
8-28	9-29	PC	1¼	O.K.	O.K.
8-28	9-29	C	2¾	O.K.	O.K.
8-29	9-29	C	2¾	O.K.	O.K.
8-29	9-29	C	2¾	O.K.	O.K.
8-29	9-29	PC	1¼	O.K.	2 live B.
8-30	9-30	C	2¾	O.K.	O.K.
8-30	9-30	BW	3½	O.K.	O.K.
8-30	9-30	PC	3½	O.K.	O.K.
8-31	9-30	C	2¾	O.K.	O.K.
8-31	9-30	PC	1¼	O.K.	O.K.
8-31	9-30	PC	1¼	O.K.	O.K.

Corn Meal

8-1	9-1	CM	5	O.K.	O.K.
8-1	9-1	CM	3	O.K.	O.K.
8-2	9-2	CM	5	O.K.	1 live B.
8-2	9-2	CM	3	O.K.	O.K.
8-3	9-2	CM	3	O.K.	O.K.
8-3	9-2	CM	5	O.K.	O.K.
8-11	9-11	CM	3	O.K.	O.K.
8-11	9-11	CM	5	O.K.	O.K.
8-11	9-11	CM	3	O.K.	O.K.
8-11	9-11	CM	3	O.K.	O.K.
8-11	9-11	GM	3	O.K.	O.K.
8-12	9-12	CM	3	1 dead B.	O.K.
8-15	9-15	CM	3	O.K.	O.K.
8-15	9-15	GM	3	O.K.	O.K.
8-17	9-16	CM	5	O.K.	O.K.
8-17	9-16	CM	3	O.K.	O.K.
8-17	9-16	CM	3	O.K.	O.K.
8-22	9-22	CM	3	O.K.	O.K.
8-22	9-22	CM	3	O.K.	7 live B.
8-22	9-22	CM	5	O.K.	O.K.
8-24	9-25	CM	5	O.K.	O.K.
8-24	9-25	CM	3	O.K.	O.K.
8-24	9-25	CM	3	O.K.	O.K.
8-24	9-25	GM	3	O.K.	O.K.

OCTOBER, 1939

9-1	10-2	PC	1¼	O.K.	O.K.
9-1	10-2	PC	1¼	O.K.	O.K.
9-2	10-2	PC	1¼	O.K.	O.K.
9-5	10-5	PC	1¼	O.K.	O.K.
9-5	10-5	PC	1¼	O.K.	O.K.
9-5	10-5	PC	1¼	O.K.	O.K.
9-6	10-6	PC	1¼	O.K.	1 live B.
9-6	10-6	PC	1¼	O.K.	1 live L.
9-7	10-7	PC	1¼	1 dead B.	1 live B.
9-7	10-7	PC	1¼	O.K.	O.K.
9-7	10-7	PC	1¼	O.K.	2 live L.
9-8	10-7	PC	1¼	O.K.	1 live B.
9-8	10-7	PC	1¼	O.K.	20 live B.
9-9	10-9	BW	1¼	O.K.	2 live B.
9-9	10-9	PC	1¼	O.K.	O.K.
9-11	10-11	PC	1¼	O.K.	O.K.
9-11	10-11	BW	1¼	O.K.	O.K.
9-12	10-12	PC	1¼	O.K.	15 live B.
9-12	10-12	PC	1¼	O.K.	O.K.
9-13	10-13	PC	1¼	O.K.	O.K.

OCTOBER, 1939 (Cont'd)

Date pkgd.	Exam-ined	Prod-uct	Size lb.	Treated	Untreated
9-13	10-13	PC	1¼	O.K.	O.K.
9-13	10-13	PC	1¼	O.K.	O.K.
9-13	10-13	CC	1¼	O.K.	O.K.
9-14	10-14	PC	1¼	O.K.	O.K.
9-14	10-14	PC	1¼	O.K.	O.K.
9-14	10-14	PC	1¼	O.K.	O.K.
9-15	10-14	PC	1¼	O.K.	O.K.
9-15	10-14	PC	1¼	O.K.	O.K.
9-15	10-14	PC	1¼	O.K.	O.K.
9-16	10-16	PC	1¼	O.K.	1 live B.
9-18	10-18	PC	1¼	O.K.	O.K.
9-18	10-18	PC	1¼	O.K.	O.K.
9-18	10-18	BW	1¼	O.K.	O.K.
9-19	10-19	BW	1¼	O.K.	7 live B.
9-19	10-19	PC	1¼	O.K.	O.K.
9-19	10-19	BW	1¼	O.K.	O.K.
9-2	10-2	C	2¾	O.K.	O.K.
9-5	10-5	C	2¾	O.K.	O.K.
9-7	10-7	C	2¾	O.K.	O.K.
9-7	10-7	C	2¾	O.K.	O.K.
9-7	10-7	PC	3½	O.K.	O.K.
9-13	10-13	PC	3½	O.K.	O.K.
9-13	10-13	PC	3½	O.K.	O.K.
9-15	10-14	PC	3½	O.K.	O.K.
9-15	10-14	BW	3½	O.K.	O.K.
9-15	10-14	BW	3½	O.K.	O.K.
9-18	10-18	PC	3½	O.K.	O.K.
9-18	10-18	BW	3½	O.K.	O.K.
9-18	10-18	PC	3½	O.K.	O.K.
9-18	10-18	BW	3½	O.K.	O.K.
9-18	10-18	BW	3½	O.K.	O.K.
9-19	10-19	BW	3½	O.K.	O.K.
9-19	10-19	BW	3½	O.K.	O.K.
9-20	10-20	PC	1¼	O.K.	O.K.
9-20	10-20	PC	1¼	O.K.	O.K.
9-21	10-21	PC	1¼	O.K.	O.K.
9-21	10-21	PC	1¼	O.K.	O.K.
9-21	10-21	PC	1¼	O.K.	O.K.
9-22	10-21	PC	1¼	O.K.	O.K.
9-22	10-21	PC	1¼	O.K.	O.K.
9-22	10-21	PC	1¼	O.K.	O.K.
9-23	10-23	CC	1¼	O.K.	O.K.
9-25	10-25	BW	1¼	O.K.	O.K.
9-25	10-25	PC	1¼	O.K.	O.K.
9-20	10-20	PC	3½	O.K.	O.K.
9-20	10-20	BW	3½	O.K.	O.K.
9-21	10-21	PC	3½	O.K.	O.K.
9-21	10-21	BW	3½	O.K.	O.K.
9-22	10-21	BW	5	O.K.	O.K.
9-25	10-25	PC	3½	O.K.	O.K.
9-26	10-26	PC	1¼	O.K.	O.K.
9-26	10-26	PC	1¼	O.K.	O.K.
9-27	10-27	PC	1¼	O.K.	O.K.
9-27	10-27	PC	1¼	O.K.	O.K.
9-27	10-27	BW	1¼	O.K.	O.K.
9-27	10-27	CE	1¼	O.K.	O.K.
9-27	10-27	BW	3½	O.K.	O.K.
9-27	10-27	BW	5	O.K.	O.K.
9-27	10-27	GM	3	O.K.	O.K.
9-28	10-28	BW	3½	O.K.	O.K.
9-28	10-28	PC	3½	O.K.	O.K.

NOVEMBER, 1939

10-2	11-2	PC	1¼	O.K.	O.K.
10-2	11-2	PC	1¼	O.K.	O.K.
10-3	11-3	PC	1¼	O.K.	O.K.
10-3	11-3	PC	1¼	O.K.	O.K.
10-4	11-4	PC	1¼	O.K.	O.K.
10-4	11-4	PC	1¼	O.K.	O.K.
10-5	11-4	PC	1¼	O.K.	O.K.
10-6	11-6	PC	1¼	O.K.	O.K.
10-6	11-6	PC	1¼	O.K.	O.K.
10-6	11-6	PC	1¼	O.K.	O.K.
10-7	11-7	PC	1¼	O.K.	O.K.
10-9	11-9	PC	1¼	O.K.	O.K.
10-9	11-9	PC	1¼	O.K.	O.K.
10-9	11-9	BW	3½	O.K.	O.K.
10-9	11-9	PC	3½	O.K.	O.K.
10-9	11-9	BW	3½	O.K.	O.K.
10-10	11-10	PC	1¼	O.K.	O.K.
10-10	11-10	PC	1¼	O.K.	O.K.
10-10	11-10	PC	3½	O.K.	O.K.
10-11	11-11	PC	1¼	O.K.	O.K.
10-11	11-11	PC	1¼	O.K.	O.K.
10-11	11-11	CE	1¼	O.K.	O.K.
10-12	11-11	PC	1¼	O.K.	O.K.
10-12	11-11	PC	1¼	O.K.	O.K.
10-12	11-11	BW	1¼	O.K.	1 live L.
10-12	11-11	BW	1¼	O.K.	O.K.
10-13	11-13	BW	1¼	O.K.	O.K.
10-13	11-13	PC	1¼	O.K.	O.K.
10-13	11-13	BW	1¼	O.K.	O.K.
10-13	11-13	BW	1¼	O.K.	O.K.
10-13	11-13	PC	1¼	O.K.	O.K.
10-16	11-16	B	1¼	O.K.	O.K.
10-18	11-18	CC	1¼	O.K.	O.K.
10-13	11-13	PC	1¼	O.K.	O.K.
10-13	11-13	BW	1¼	O.K.	O.K.
10-18	11-18	PC	1¼	O.K.	O.K.
10-17	11-17	B	2½	O.K.	O.K.
10-19	11-17	BW	3½	O.K.	O.K.
10-30	11-29	BW	1¼	O.K.	O.K.
10-30	11-29	BW	1¼	O.K.	O.K.

DECEMBER, 1939

11-1	12-1	PC	1¼	O.K.	O.K.
11-1	12-1	PC	1¼	O.K.	1 live B.
11-2	12-2	PC	1¼	O.K.	O.K.
11-2	12-2	PC	1¼	O.K.	O.K.
11-2	12-2	CE	1¼	O.K.	O.K.
11-3	12-2	PC	1¼	O.K.	O.K.
11-3	12-2	PC	1¼	O.K.	O.K.
11-4	12-4	PC	1¼	O.K.	3 live L.
11-4	12-4	PC	1¼	O.K.	O.K.
11-5	12-5	PC	1¼	O.K.	O.K.
11-5	12-5	PC	1¼	O.K.	O.K.
11-6	12-6	B	1¼	O.K.	O.K.
11-16	12-16	CE	1¼	O.K.	O.K.
11-16	12-16	PC	1¼	O.K.	O.K.
11-16	12-16	PC	1¼	O.K.	1 live B.
11-21	12-21	PC	1¼	O.K.	2 live B.
11-21	12-21	BW	1¼	O.K.	O.K.
11-22	12-22	PC	1¼	O.K.	O.K.
11-22	12-22	BW	1¼	O.K.	O.K.
11-24	12-23	CC	1¼	O.K.	O.K.
11

Recipe Creates
NEW MARKET for *OLD* Product

Housewives now buy candy bar to make cookies

By
By IVAN C. MILLER
Distribution Editor, FOOD INDUSTRIES

MRS. Ruth Wakefield, owner of Toll House Inn, Wakefield, Mass., originated the recipe for a tasteful cookie which gained the immediate approval of her guests. The cookie recipe included the "folding in" of small chunks or bits of semi-sweet chocolate before baking. These bits of chocolate remained intact, nut like, in the finished cookie—a product tasteful, toothsome and different.

Because of the acceptance given the cookie, its recipe was included in a cookbook, "Toll House Tried and True Recipes," compiled by Mrs. Wakefield, specifying chopped bits of Nestlé's semi-sweet chocolate bar. Until this time that chocolate bar had been sold as a confection. But as a result of the cookbook recipe, its sale as a cooking chocolate was stimulated to a modest degree.

Then, a friend of Mrs. Wakefield, Margery Mills, food editor, broadcast the recipe for Toll House cookies. Housewives in the Boston area flocked to neighborhood stores, bought the recommended Nestlé's semi-sweet choccolate bars and prepared the new Toll House cookies. They bought once, they bought again and again, and they told their friends. The increase in sales was sufficient to attract the attention of the Peter Cailler Kohler Swiss Chocolate Co., Inc., Fulton, N. Y., manufacturers of the bar.

Two actions resulted. Time on Margery Mills' program was taken to promote Toll House cookies made with Nestlé's chocolate. The chocolate bar wrapper was also revamped to include an illustration of Toll House Inn and the recipe for the cookies.

The sales results in the area covered by the Margery Mills program were encouraging. Broadcasting time was then taken on the "Martha Deane" program on WOR. Spot announcements on Eastern stations were also taken to popularize the Toll House cookie made with Nestlé's chocolate bar. Partly as the result of this promotion, sales of the semi-sweet chocolate bar have increased. Nestlé's semi-sweet bar, formerly largely sold as a confection, is now stocked as a cooking chocolate in most of the grocery outlets in the area where the cookie recipe is known.

Other food manufacturers have become aware that the Toll House recipe is a key to increased sales. General Mills' "Gold Medal" flour carries a recipe for a chocolate bit cookie. So also do the new packages for Lever Bros.' "Spry" and McCormick's vanilla extract.

FEW instances in food product promotion give greater evidence of the value of recipes on the package. Two other facts of importance are also brought out by this successful promotion. The cookbook is a slow though worthwhile medium of promotion. Housewives listen to, and react to the type of radio program which provides household helps, meal planning and cooking information.

Not all credit for this cookie vogue can be given the radio promotion nor the recipe on the label. The popularity of Toll House cookies has spread at luncheons, bridge and teas by word of mouth. Thousands of women are making the cookies who never head the recipe over the air. They first tasted the cookies at a luncheon or made them on the recommendation of a friend.

Cookie recipes are legion. Why should one rise to such popularity? Not alone because it was new—just a fad. Its popularity has outlived its newness—the fad period. It is a "repeater." The answer to this question should be a guidepost to food manufacturers in selecting and improving the products they manufacture.

Possibly the Toll House cookies have merited acclaim because they are easy to make. Possibly the recipe is infallible. Most likely the cookie's popularity rests on the fact that the cookie is tasteful, toothsome and, as most women claim, "altogether delicious."

Some few women buy foods for vitamins, some for minerals, some to "balance the diet." The variety of reasons may be many, but the dominating motive in selecting most foods for the majority of American tables is the taste and flavor appeal.

This is an article on

PUBLIC RELATIONS

It is important to

All Food Manufacturers

Because it sounds a warning. Some housewives are crusading against business practices which they think are wrong. They must be told why business does what it does. Otherwise, business may suffer.—The Editors.

Representatives of women's clubs at The Second National Conference on Consumer Education held at Stephens College, Columbia, Mo.

Tell Your Business To Your Customers

They are an organized power and may hurt the business they don't understand

By MRS. HELEN SLATER

Chairman of consumer education for City Federation of Women's Clubs, New York, N. Y.

ALL food manufacturers know consumers as customers, but not all food manufacturers have heard of the "consumer movement." Few really know what it is, its strength, its purposes. Very few realize to what extent it influences business.

"Consumers" are all of us who buy merchandise to supply our needs or satisfy our wants. Those who make up the "consumer movement" are consumers too. But they are more. They are members of groups, groups whose intent it is to advance the interests of consumers—with little concern for the consequences. These groups are many, among them organizations with 20,000 local units whose membership totals more than 5,000,000. The strength of the combined vote of these groups is a potential threat to send a chill through the most fearless officeholder.

Though many of these groups are sincere in their zeal to "lower the cost of living and better the lot of the consumer," they are often unaware of the results should many of their demands be granted. In fact, most of the millions of members of the organized women's groups give no study and little thought to the demands the groups make. If the group circulates a petition, they sign. If the leaders present a resolution, the membership votes "yea."

One woman club member, wife of a business man, was handed a petition and asked to get signers. Whatever the intent of those who prepared the petition, had it fulfilled its purpose, the successful career of a reputable business would have been ended. This clubwoman secured hundreds of signatures. Few of the signers knew what they signed. Few even read the petition. Few, if any, from the experiences of their own lives, would have known the significance of the petition had they read it. However, they considerately did as asked. They signed. Even the originator of the petition was honest of intent. However, she had not studied both sides of the question. In fact, she was not aware there was more than one side.

At one meeting, the last one, where the petition was passed around, the lecturer advised women to talk over with their husbands and fathers all problems involving business. The lecturer urged women to orient their viewpoints on business and to be sure that their organization's attempts were not actually harmful to their own interests. That night the clubwoman, who had mailed the petition with its hundreds of signatures to a legislator, discussed the petition with her husband. She learned that the business she unintentionally was endeavoring to destroy was the main source of her husband's income.

Before women were franchised, their vote could not influence business. Their opinions could only be "voted" through the male members of the family. The fact that women had scant, if any, knowledge of business before 1920 was deplorable but of little material consequence to business. Today women vote. They are articulate. They are organized. They petition legislators—swamp them with mail. On occasions they boycott. Today, as in 1920, their real knowledge of business is deplorably scant. Today that fact is of the utmost consequence.

Business hasn't bothered to acquaint outsiders with the inside facts. "Business is intricate. Its secrets are for the initiated. The buyer can't exist without business. Business lives by its customers." That's that. But unfortunately it is an attitude too smug. It is the attitude which small interested groups use as an entering wedge

to gain a following in organized women's groups. And these subversive organizations have been as vocal as business has been silent. They have had their story to tell and an attentive audience to tell it to.

Business does not attend these meetings officially—rarely is represented incognito. Had business been present at a great number of these meetings it would have heard itself consistently thumped, frequently damned. Here are a few statements made before meetings of various women's groups:

"Business makes money, consumers spend money. Therefore, their interests can not be the same. I think of business as being interested only in the obtaining of the money consumers must spend and as being completely unscrupulous in its effort to obtain the money."

"You can no longer trust your own judgment—you must rely on testing laboratory reports before you buy. Bring your children up to be good buyers by teaching them that at an early age."

"Business booklets are not dependable. Business has an ulterior motive in preparing this information. Its chief purpose is to sell. Flowery language and colorful pictures, usually misrepresentations, are aimed at selling rather than giving the factual information consumers need for good buying."

"We must not put our trust in business. There are many government departments to which we can take our troubles and get results. The government will soon put business in line if we make our wants known. We have a powerful weapon in telegrams, letters and petitions, and government officials will do as we ask against business."

Some of the "anti" organizations publish pamphlets and magazines which have relatively small, but effective, circulation. Among the consumers who can afford to pay for these are most of the articulate antagonists. Few run-of-the-mill consumers can pay for such information—which is of doubtful use to them at best. Protected by the very law which the "antis" seek to replace by one of their own chosen "isms," these organizations have gained real headway during the time when business was completely unaware of, or interested in, the desires and needs of the consumer.

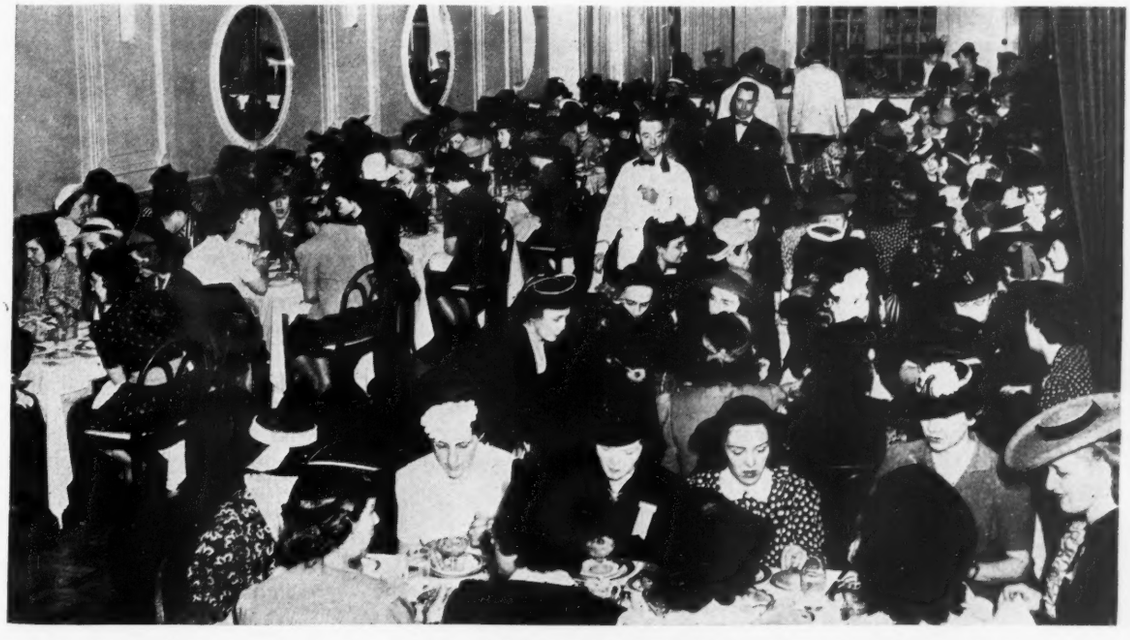
NOT all women's groups concern themselves with problems of the consumer. Sometimes a local unit of an organization will develop a consumer program even though the state or national organization remains aloof. It is also true that even though some of the state or national organizations take a definite stand on consumer issues, some of the local units ignore the issues entirely in their program of activity.

Four very important women's groups do have consumer education programs. These four are the General Federation of Women's Clubs, League of Women Voters, American Association of University Women and the American Home Economics Association. Whether they ally themselves eventually with business or not is a real problem business must face today. The answer will depend largely on the attitude of business.

These four groups are well organized. They have small groups in every state and city and often in small hamlets. They are headed by responsible, serious women who represent the educated, reading, spending groups, the cream of the manufacturers' customers.

For years the "antis" have been wooing these organizations with varying degrees of success. Being late, business has the harder job of convincing to do. But it can be done. These women have good minds. Their organizations are committed to the policy of presenting both sides of any question to members. Recently, when confronted with the fact that her group had not done so, one leader said, "I find it difficult to get business speakers who are worth listening to or who can hold an audience—an intelligent audience. Apparently business leaders want only to give a sales talk and do not have, or do not want, to give us the information we want and need. We do not want, nor can we afford, to take sides. I will gladly place business speakers on my programs if they will give their lectures without trying to sell every woman in the audience a can of soup, a breakfast cereal, or something else."

Women are interested primarily in their homes. They are interested in things which affect their homes. Food, because it enters constantly into home



Home economic students from fifteen schools meet with women in business to learn of the opportunities and responsibilities of women in the food industries

planning, is of primary importance to them. They are less likely to believe tall tales about foods, yet more prone to criticize, more aware of defects or faulty practices. Food is so tied up with family health that women are more open to an enlightened approach on the subject of food than anything else.

Intelligent women are ready and eager to learn anything which will help them run their homes successfully and keep their families happy and comfortable. They can understand the simple economic facts which are the chief and the honest weapons of business. Good programs aimed at this intelligent group which tell a good story well and answer questions satisfactorily will do a great deal toward eliminating the "anti" groups from the programs of these organizations.

IT is particularly important that women who make up the membership of organized groups should be given a full understanding of the effect of pending legislation upon business and the consequent effect upon consumers. During the past several years a number of laws have been passed aimed to "protect" the consumer from business practices, etc. The laws have been pushed by pressure groups of one sort or another. Investigation will show that these pressure groups had a far different reason for pushing the laws than appeared on the surface.

There should be someone in every business organization who knows about these laws and also what persuasion was used to create consumer thinking about them. This is a job for a woman, preferably, since women talk more freely to another woman than to a man. Furthermore, the knowledge of the consumer's viewpoint, viewed through the eyes of a woman, is essential in business today.

The Wheeler-Lee Bill controlling advertising is one of the pressure laws. Through the use of petitions and organization representatives, consumers were quoted as wanting this bill and needing it. They were quoted as complaining of being "cheated and deceived." Of any possible 100 run-of-the-mill consumers one might ask, only a few would be able to identify the bill or would be aware of their own personal need for it.

One woman, a Wheeler-Lee Bill petition signer, when asked recently why she wished the bill passed explained, "Advertising is dishonest—it defrauds." When asked if she had ever been defrauded by advertising, she hurriedly admitted, "Oh, dear no. I never buy patent medicines." Then she added, "The worst thing about advertising is the exaggerations, but then, I never buy anything when the advertisement exaggerates." She signed a petition to save other women, not herself, from patent medicines and the exaggerations of advertising.

A great deal of expensive law-making, and the present expensive enforcement of that law, might have been avoided if a program of talking things over had been inaugurated by advertising some years ago. Had advertising listened to the persistent rumbling, much which has happened since might have been avoided. Business, in the years gone by, has done notable house cleaning. Unprodded by government, it has corrected existing evils and raised the level of its ethics, as well as the quality of its products and the sanitation of its plants. One of the most notable examples of this is the way reliable business firms inaugurated and backed the Pure Food Law of 1906.

Regardless of the attitude and acts of a few members within some groups most organization members as individuals have little concern with those happenings which make "hot consumer news."

The Federal Trade Commission's case against *Good Housekeeping* was not popular with consumers in general. Most of them liked *Good Housekeeping* and did not feel they had been fooled by it. Many of those questioned did not know there was such a case. Remarkably few run-of-the-mill consumers are familiar with FTC and its functions.

THE Boren bill, now in committee, would designate the National Bureau of Standards as originator of standards of quality for consumer goods and would empower the Secretary of Commerce to create an advisory committee on consumer standards which would be the equivalent of a consumer agency. One clubwoman's comment on the Boren bill may not be typical. It is, however, revealing: "When the Boren bill is passed, manufacturers will have to make their blankets warm, they can't sell us dresses that fade and things will wear a lot longer."

These are but a few of the bills which have been or will be introduced to hamper business at no great advantage to the consumers the bills are supposed to help.

Business can very well expect a long, hard pull in its belated job of creating a consumer understanding among its customers. When, however, the understanding is reached it will be well worth the cost involved. Understanding will result in better feeling among employees (who, after all, are consumers), a more satisfied customer group and a general feeling of good will among the executives themselves.

Creating consumer understanding is a task for specialists. No business should be without a department the responsibility of which is to study consumer needs in relation to the company's products, to meet with consumers regularly and to attempt to interpret honestly and sincerely the company and its products. It should be this department's duty to interpret women consumers to business and business to women consumers. It is a task for women.

If it looks as though this department and its program might cost something quite tangible without bringing direct returns into the cash box, and if it appears, therefore, that such a department should be put off until another day when there is more money for such a department, that is indeed unfortunate. Now is the time. The longer the wait the more the opposition to be overcome. It must be remembered that in the end, when the "antis" are no longer able to present "the most logical story," the investment in a consumer department will be on the right side of the ledger.

If such a department is sanctioned, this department can give women consumers the business side of the picture—can help them to think of themselves and their households as partners with business in economic stability, both inseparable, producers and consumers. Women can be brought to an understanding of the problems which business faces in carrying out their wishes and in providing for them the products they need at the prices they can reasonably pay. It is mainly a woman's task to bring to other women the realization that they and their families play a major role in producing the products of the country's markets. When consumers realize themselves in the position of producers as well as consumers, then we can have a consumer understanding.

But before there can be understanding, the business man must face his problem, and know that the way to preserve private enterprise is to work hand in hand with the consumer—to wipe out the veil of misunderstanding which has blinded these two great forces, business and the consumer, to common interests. This will be done when the knowledge is mutual that each is interdependent.

An intelligent consumer relations program is the first move in reaching this goal.

Hints and Hurdles

Sell Food Flavor, Not Drug Properties

NOTICE has been given by the Food & Drug Administration of a hearing to receive evidence on which to base regulations prescribing label statements concerning vitamins, minerals and other dietary properties of foods that report to be or are represented for special dietary uses by humans. According to the bulletin of American Butter Institute, "The Wisconsin State Dairy Industries Association appears to regard F&DA's proposal as one which, if adopted, would result in the total extinction of dairying in Wisconsin. A resolution passed by the association on April 6th calls upon 'everybody in Wisconsin to voice opposition to the proposed measure' and to 'send letters to their Congressmen and the United States Department of Agriculture protesting this action, and if possible to be present in person at the hearings on April 29th to oppose adoption of the regulations.'

"Butter and cheese, about which the Wisconsin association's concern seems to be greatest, have not, to the best of our knowledge, been customarily labeled or advertised for *special dietary uses* in the manner of cod liver oil, specially prepared cereal foods for infant or invalid feeding, spring tonics and foods of that type. We hope they will continue to be sold as wholesome, healthful, flavorful foods for young and old, and that no attempt will be made to put them in the same class with mineral and vitamin concentrates, baby foods, specifics or proprietary products.

"Butter and cheese have natural nutritive properties. So have green vegetables, spinach, dandelion greens; fish and oysters; oranges, grapefruit, and a host of other good things we eat. We can't imagine anyone being denied the right to make truthful, well-founded statements in advertising as to the properties of these foods, nor can we feel that the FDA proposal is primarily aimed at anything but foods which purport to be and are represented as foods *for special dietary uses,* whose value *for such uses* is based solely or chiefly upon their vitamin, mineral or other peculiar constituents.

"However, we do feel that the making of extravagant claims on the label of any food product, concerning special properties of disease prevention, cure or alleviation, basing such claims upon the vitamin or mineral content of such foods, may possibly bring them within the purview of the regulations proposed."

The bulletin is signed by N. W. Hepburn, Executive Secretary. We agree with Secretary Hepburn. Why narrow the market for food by creating the impression that it is a drug or a medicine?

Among Things To Be Bought Food Wasn't Even Mentioned

A REPORT released by the Research Bureau of DePaul University, Chicago, tabulates the results of a study to determine what items Chicagoans planned to buy next. Most people interviewed planned to buy an automobile.

The automobile ranked high not only as first choice but also as second, third, fourth and fifth choice. Books ranked at the bottom of the list of 45 items. For every person who planned to buy a book, 100 others planned to buy an automobile. However, the total annual sales of automobiles reveals the fact that only one family in every fifteen bought an automobile in 1938 while six books were sold for every family in the country.

Food wasn't even on the planned item list, yet Chicago families spent more for food than for anything else, planned or not planned. Queer creatures these humans and fortunate for the food manufacturer that they are. Fortunate also is the manufacturer who finds a moral in this and makes a self-starting top-flight salesman of his package and the goods he offers for sale.

The vogue for "Toll House" cookies made with bits of semi-sweet chocolate has induced process changes as well as label changes. Baker's semi-sweet chocolate bar, product of Walter Baker & Co., Inc., New York, has on its new wrapper a chocolate-chip-cookie recipe. Rockwood & Co., Brooklyn, N. Y., now processes small chocolate drops, suitable for use in preparing chocolate-bit cookies

New Packages & Products

Multi-cereal Breakfast Foods

In a field long overcrowded, a new breakfast cereal makes a claim for distinction and a national market. "Crunch-Ettes," product of Cera-Lac Co., Los Angeles, introduced on the West Coast about a year ago, is expanding into new markets. The product is not the result of processing a single grain, but the result of processing a blend of many. Crunch-Ettes breakfast food is made of wheat, rye, buckwheat, oats, bran and corn, and sweetened with dextrose.

Lard Bids for Display

The new 3 lb., blue and white, lithographed, key-opened tin container for "Silverleaf" lard, recently adopted by Swift & Co., Chicago, offers an inducement to grocers to give shelf room and point-of-sale display to the product, too often held in the refrigerator and out of sight. The new container has another modern note. Recipes for the use of shortening in cooking appear on the back panel of the label and on the under side of a stiff paper disk held in place on the top of the container by the key opener.

You Eat the Container

"Eat the contents. Eat the jar," reads the label of the cartons for the edible "Fruitainers" filled with orange honey jelly and citrus marmalade, products of Continental Fruit Co., Chicago. This novel natural fruit shell made from oranges or grapefruit provides a convenient and economical outlet for otherwise almost useless byproducts. Consumers like the package because it adds interest to the contents and solves the disposal problem. This 1 lb. 14 oz. Fruitainer has a sealed sugar pectin cap. Directions for opening appear on the outer wrap. Tissue paper inside the individual cartons protects the edible shell.

Sirup from Dates

National distribution of "Angelo" date sirup, product of Tupman-Thurlow Sales Co., Inc., New York, began in April after its introduction to the consumer trade in the Iraq Pavilion at the New York World's Fair last summer. Described as a new taste thrill and made from imported dates, the sirup not only provides a new use for a fruit as old as the Nile but adds another to the growing list of new products from old. A recipe booklet (attached by a string and held intact by a plastic band around the closure of the 8 oz. bottle) states that date sirup contains mineral salts and vitamins A and B, besides the natural date sugar. But the booklet stresses flavor rather than health values.

Sausage in Bulk a Century Now Packaged Precooked

After almost a century of distribution as a trade-branded uncooked

product, "Deerfoot Farm" sausage now comes to the market precooked and canned in its own lard. Originally developed in 1847 by a Southborough, Mass., spice importer for local rural consumption, the sausage also obtained urban acceptance as the result of samples sent to city friends. Demand soon forced production to begin on a commercial basis. Today, almost a century later, the precooked and preshrunk sausage links are packed thirteen to fourteen to the 8 oz. can by Deerfoot Farms Co., Southborough, Mass., and distributed by Kraft Cheese Co., New York. Another gain for precooked ready-to-serve packaged foods.

Package for Quality Appeal

New evidence frequently comes to light indicating the awareness of food manufacturers, especially confectioners, of a market willing to pay a price commensurate with quality (FOOD INDUSTRIES, September, 1939, page 507). The five-cent rough-dipped candy bars, pecan crunch, almond toffee and pecan square, products of Pangburn Co., Fort Worth, Tex., bid for the patronage of this market with the slogan, "Not so big, but so good." These 1 oz. products, wrapped in paper-backed metal foil and transparent cellulose, compete in the market with 3 and 4 oz. candy bars, selecting the quality conscious groups of the consuming public.

Trucks Replace Freight Cars

In Shipment of Perishable Product

Reduce time in transit and cut costs in fresh fish distribution

MUCH of the fresh salt-water and fresh-water fish and seafoods consumed in the inland city of Pittsburgh is now hauled into that metropolis by motor trucks. Automotive equipment in such service has largely superseded the railroad express car and freight car runs because of less time in transit from the distant fish unloading docks to the Pittsburgh city market. The cost is less because of the fewer handlings and better condition of the products upon arrival.

The Live Fish Co., Pittsburgh, is one of the largest jobbers and distributors of lake and sea fish and seafoods in western Pennsylvania, eastern Ohio and West Virginia. It operates three markets in different sections of Pittsburgh and employs a fleet of ten trucks, tractors and trailers exclusively in the work.

Five of the automotive units are continually on the road hauling from the points of supply, and the remainder are used in local deliveries in Pittsburgh and its environs. The long distance road units are made up of two Mack tractors and Freuhauf trailers, one Mack straight truck unit and two Fords, all with closed and insulated, but not refrigerated, bodies. The local trucks have open pick-up or stake bodies. Views of all three types of vehicles are shown in accompanying illustrations.

The principal source of salt-water fish supply is the great fish docks of Boston, Mass., although some fish are secured from Sea Isle City, Cape May, Beach Haven, Atlantic City and other points along the New Jersey coast. Some pick-ups are also made at Virginia and Maryland points as well as from New York City. Additional daily hauls are made with fresh-water fish from Sandusky, Ohio, from Erie, Pa., and intermediate points.

FROM Boston come haddock fillets, perch fillets, sea scallops, smoked fillets, cod fillets and so forth. New Jersey points supply flounders or flukes, butterfish, croakers, porgies, squid, sea trout, sea bass and whitings. From Virginia come spots, croakers, sea trout, sea bass and flukes; while from New York City, scallops, smelts, tilefish and so forth are picked up. From Sandusky and Erie come blue and yellow pike, perch, whitefish, white bass, etc.

One of the Mack tractor and trailer units leaves Boston every Monday afternoon with a payload of 17,000 lb. of fresh fish. The fish are loaded directly into the trailer from the Boston fish piers and are not rehandled until they arrive at one of the Live Fish Co. markets in Pittsburgh. The road mileage between Boston and Pittsburgh is 740 miles. The run is made in from 26 to 30 hours, or at an average speed of from 25 to 28 miles an hour.

As compared with rail shipments, the railroad express car time between Boston and Pittsburgh is 26 hours and the time of the freight car previously used extensively, 40 hours or more. By either method, however, one more handling is required in the unloading of the fish in the Pittsburgh railroad yards and a subsequent haulage to the company's branch platform and into its ice boxes.

The second tractor-trailer unit is used to bring in solid loads of frozen fish from Boston or Gloucester, Mass., New York City, or even Chicago, depending upon where purchases are made.

When fresh fish are hauled, the fish are packed in wooden cases with finely crushed ice at top and bottom and between the layers of the fish. The ice is used summer and winter, in the former to keep the fish from spoiling and in the latter to keep them from freezing.

The ice pack, taken in conjunction with two layers of cork insulation in the floor, roof and sides of the trailer body, is adequate for the delivery of

Two other units in the Live Fish Co. fleet, that at the left being a local Pittsburgh delivery truck and that at the right, the Mack Tractor and Fruehauf trailer which hauls 17,000-lb. loads of salt water fish direct from Boston to Pittsburgh and makes the 740 mile run in from 26 to 30 hours. The fish are packed in cracked ice in wooden boxes and are not handled from the time they are sorted into classes on the Boston fish wharves and loaded into the trailer body until they reach the markets of the Live Fish Co. in the city of Pittsburgh.

One of the newest trucks in the Live Fish Co.'s fleet, a Mack with the body painted in white enamel with the hood and cab in green. It operates on the run from the sources of fish supply along the New Jersey coast to Pittsburgh and makes two trips a week. The Live Fish Co. is a large distributor of fish and seafoods.

the load from Boston to Pittsburgh in prime condition. No other refrigerant is used. When loads of frozen fish are hauled, about 200 lb. of dry ice is used to prevent defrosting enroute.

The Fords with the closed bodies usually operate on the Sandusky, Ohio, run. The road mileage between Sandusky and Pittsburgh is about 200 miles.

The run is generally made at night, the fish being packed, usually alive and kicking, immediately after the boats arrive, so that the trucks leave about 8 p.m. They arrive in Pittsburgh the following morning at from 5 to 6 a.m. with the fish virtually in a live condition, the word "live" in fish parlance meaning fresh or live caught.

The Erie, Pa., to Pittsburgh run is made daily in the season when the former port is active. The smaller trucks are usually used on the run since it only takes five hours.

In keeping with the trend in the food industries to paint the trucks handling food products in some light color, the closed body trucks in the Live Fish Co. fleet have their bodies painted with white enamel, with the hood and cab in green. As to the closed bodies themselves, one of the prime requisites of construction is to drain them adequately of the melted ice in order to prevent excessive rotting of the body structure. In this connection, a water-tight floor and ample drains are essential.

The bodies, made by the Schnabel Co., Pittsburgh, have 1 in. oak floors, covered with 18 gauge galvanized steel, turned up 6 in. on the body front and sides. All joints are made water-tight by welding the seams. To further reinforce these seams, the galvanized lining is backed up by pine slats placed on 24 in. centers and mortised into the uprights and screwed into position.

The floor pan itself is fastened to the ship-lapped oak floor by countersunk wood screws. Two inch removable racks are placed on top of the floor proper in order to keep the lower boxes of fish off the floor and to permit a better flow of the melted water.

The drainage water is carried off through four large $1\frac{1}{4}$ in. drain pipes. These are located at each corner of the body.

The two layers of cork insulation in the sides and roof are set in hot asphaltum. All the metal parts are painted with rust resistant paint.

Ease and speed in loading and unloading are secured through the use of double, full height rear doors hung on piano hinges which permit them to fold back flush against the body sides when open.

Action view showing local and special delivery Ford of the Live Fish Co. fleet being loaded with boxes of Lake Erie fresh-water whitefish, pike, perch or pike fillets.

The Food Industry News

GENERAL NEWS, BUSINESS TRENDS, MEN, JOBS AND COMPANIES • MAY, 1940

A. KIRSCHSTEIN

HARRIS PERLSTEIN

Mr. Kirschtein, of Fox Head Waukesha Corp., Waukesha, Wis., is the 1940 chairman of American Brewing Industry. Mr. Perlstein, of Pabst Brewing Co., Chicago, is the new president of the association.

Brewing Industry Associations Merge And Bring Together Largest Companies

Announcement that the Brewing Industry, Inc., had joined with the American Brewers' Association for the formation of a new and succeeding association, American Brewing Industry, climaxed the annual meeting of the American Brewers' Association in Chicago on March 27. Voting to that end took place during the March 26 closed meeting of the ABA and a secret meeting of the BII held in Chicago the same day.

Union of these two groups in the brewing industry brings together the two largest volume-producing companies, Anheuser-Busch, Inc., and Pabst Brewing Co., and a large number of other companies scattered widely over the United States.

The officers of the new organization are: chairman of the board, A. Kirschstein, Fox Head Waukesha Corp., Waukesha, Wis., formerly president of ABA; president, H. Perlstein, Pabst Brewing Co., Chicago, formerly president of BII; first vice-president, C. W. Newcome, Jacob Schmidt Brewing Co., St. Paul, formerly first vice-president of ABA; second vice-president, Richard G. Jones, Jackson Brewing Co., New Orleans, formerly the vice-president of BII; secretary, William L. Goetz, M. K. Goetz Brewing Co., St. Joseph, Mo., formerly chairman of the board of ABA; treasurer, J. S. McCourtney, Columbia Brewing Co., St. Louis, Mo., formerly treasurer of BII. The 24 directors represent an equal number of the company members of the former associations.

Plans and program for the new association activities are in the making and will be announced later. Headquarters for Ralph T. Kettering, executive secretary, formerly secretary for ABA, have been set up at 228 North LaSalle St., Chicago.

President Puts F&DA Under Different Agency

President Roosevelt's reorganization plan places the Food and Drug Administration under the Federal Security Agency, taking it out of the Department of Agriculture. The change takes effect not sooner than 60 days after transmittal of the order to Congress, which was on April 11. Congress, of course, could pass a bill vetoing the move.

In sending this recommendation to Congress, the President indicated his purpose very clearly. He said "I now believe that the opportunity for the Food and Drug Administration to develop along increasingly constructive lines lies in this new agency. There is also need for coordination of certain of its functions with those of the Public Health Service."

The first impression in Washington regarding this shift is that there need be no change at all in the general type of operation and regulatory work under Chief Walter G. Campbell. He and his entire technical staff will simply report to a new superior. The transfer, of course, has no effect on either the scope or the application of the law itself.

Action on Food Standards

Progress was made last month on one of the pending coal-tar color dockets. No. 13 was completed, and the Secretary's order was published in the *Federal Register* of March 23. The effective date is June 20.

Restrictions Proposed For Dietary Food Labels

Proposed regulations for labeling foods purporting to be or represented for special dietary uses, which were published March 27 in the *Federal Register*, have drawn immediate protest from the industry. The regulations have been dubbed "revolutionary" in that they would "sweep away" the old conception that classifies many products as "normal foods," not "dietary foods."

For example, if a manufacturer claims that his product, a "normal food," will "tone up tired nerves or muscles," his product immediately becomes a "dietary food." And the label shall bear "directions for use showing the quantity of such food to be consumed during any period of one day."

An exception has been made in regard to vitamin D in milk. But when a claim is made as to vitamin D in other foods and its value in preventing or correcting a dietary deficiency, the label shall bear the statement: "When the skin is adequately exposed to direct sunshine there is no established need for vitamin D in the diet."

New Food Act Charted

There has just been issued a schematic chart of the Federal Food, Drug and Cosmetic Act of 1938. This chart is arranged in 31 columns, interpreting the various provisions of the Act. Copies are available upon application to the Consumer Standards Project, Consumers Counsel Division, Agricultural Adjustment Administration, Washington, D. C.

ANOTHER LEADING PACKER CHOOSES EFFICIENT CORK INSULATION

LOW-COST REFRIGERATION *is assured in the new John Morrell & Company plant addition, Ottumwa, Iowa . . . thanks to efficient Armstrong's Corkboard Insulation. Photo at left shows 18" x 36" sections of this dependable corkboard being installed—part of 500,000 board feet used in all.*

500,000 board feet of Armstrong's Corkboard insulate the new John Morrell & Company plant

WHEN prominent meat packers and large and small food plants throughout the country standardize on *one kind* of low temperature insulation, it has to be good. Efficient Armstrong's Corkboard has been *standard* in cold storage work for years!

This natural CORK material has always been dependable, economical insulation. It provides an effective barrier to the passage of heat and thus saves costly refrigeration. In addition, Armstrong's Corkboard helps to control temperatures within the narrow ranges so necessary to keep food spoilage at a minimum.

Armstrong's Corkboard is extremely durable and highly resistant to the moisture always encountered in low temperature work. Time and again this dependable insulation has proved its *lasting* efficiency by giving years of trouble-free service even under severe operating conditions. It is strong and rigid, fire-resistant, light in weight, and easy to handle and install.

Experienced Armstrong engineers available to advise with you can give you sound advice on all types of low temperature installations. Why not consult them before you buy insulation? They can assure you a most economical installation for maximum operating efficiency. For complete information and literature on corkboard, write to Armstrong Cork Co., Building Materials Div., 916 Concord Street, Lancaster, Pa.

Armstrong's

CORKBOARD INSULATION

Packaging Questions Answered at Conference

Eleven thousand people attended the Tenth Packaging Exposition held in New York March 26–29, and 900 were present at the conference on packaging problems held in conjunction with the Exposition. Seventy-seven exhibitors displayed and demonstrated their packaging equipment and supplies at this annual packaging conclave sponsored by American Management Association.

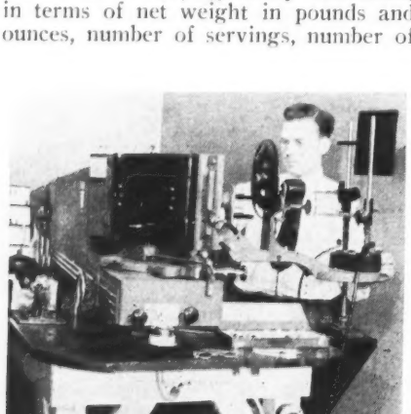
Those who attended the conferences heard the whole gamut of packaging problems discussed and the packaging trends described. The emphasis was upon the technical problems of packaging—methods, materials and machines.

Speaking on "Packaging, a Job for Management," Alvin E. Dodd, president of AMA, keynoted the conference. "In some cases there may still be too great a tendency to stress prettiness, exotic design, flashy colors and catchy adaptations of new materials at the expense of the more essential characteristics of the package," Mr. Dodd said. "The note of warning boils down to this simple suggestion—be sure the new or redesigned package is so constructed that it satisfies its first basic requirements before consideration is given to design, typography and other factors having to do with appearance."

Points which consumers consider essential on canned food labels were listed by C. W. Browne, U. S. Printing and Litho-Graphing Co., these points having been determined by questioning consumers. The points follow: (1) Brand name. (2) Quantity statement, in terms of net weight in pounds and ounces, number of servings, number of pieces, size of can. (3) Indication of grade and variety of the product. (4) Accurate pictorial of the contents. (5) Name of producer. Women are almost unanimous in their desire for recipes on the label, Mr. Browne said.

"Informative labeling is here to stay," according to Dr. Jules Labarthe, Jr., senior industrial fellow, Mellon Institute.

"Today, we recognize color as fully three-fourths of the value of the appearance factor of a package," said Howard Ketcham, color and design engineer. In the matter of copy, skillful understatement has been found more important than overstatement."



IT ANALYZES FOODS

Few Littrow spectrographs are available for commercial service. This one has been installed by Dairy Laboratories, New York, and is being used to determine the copper content of milk and the metallic contamination of other foods. Organic compounds or constituents can also be determined, usually to an accuracy of one part in one to five million. Vitamins A and B_2 can be accurately and quickly determined and methods of determining vitamin D are being developed.

Will Pass No Sugar Law

Many conflicting interests are battling for favored treatment in Congress with reference to sugar quotas. The result is so much confusion that there seems little chance for any new sugar law. Moreover, President Roosevelt has said that he opposes any modified legislation. It is expected, therefore, that Congress will merely extend the present Sugar Quota Act for an additional period.

More Cities Distribute Surplus Foods by Stamps

Baltimore; Jacksonville, Fla.; Savannah, Ga.; Raleigh, N. C.; Cedar Rapids, Iowa; and Casper and Sheridan, Wyo., are recent additions to the list of cities participating in the food stamp plan. The plan is also being extended to counties in Idaho, Oklahoma, Texas, Arizona, Michigan and Indiana. The program has now reached into more than 60 marketing areas in 38 states, and expectations are that it will be effective in about 100 cities and areas by mid-year. The Bronx, a New York City borough, is under consideration.

CAPITAL VIEWS

OVERUSE OF PATENTS — Merchandising units in the food industry will study with great care and profit the Supreme Court decision which told Ethyl Gasoline Corp. that it was making illegal use of its patent rights. This is not a novel interpretation by the court. That tribunal has frequently pointed out that a legal right, such as a patent, may by overusage lead to an illegal practice. The court says that patents may not be so stretched to permit control of merchandising, price fixing, etc.

NEW DEAL NOT OUT — Wishful thinking of the conservatives has probably led many to wrong conclusions about the Washington situation. But recent evidence clearly demonstrates that the New Deal is still amply powerful in Congress to defend its reform legislation. It did so very successfully by forcing a three-year extension of the authority to negotiate trade agreements. It is likely to defend the National Labor Relations Act similarly against extreme revision. Somewhat similar strength is being shown in the effort to tighten up on government purchases under the Walsh-Healey law.

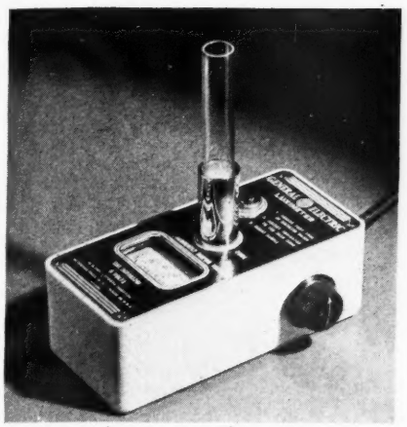
TRADE CONTROLS — Food manufacturers seeking any export market will have to play ball with the British and French. Trade controls of every possible form are expected under the aggressive military policy of the Allies. This means that food manufacturers with surpluses for sale even in Latin America would do well to seek opportunities for barter in order that they do not run afoul of military restrictions or new controls negotiated between belligerents and neutrals.

Britain and France are working as if they were a single nation. The home countries and the dominions and colonies are disregarding even recent trade agreements of the United States as they fix quotas. Purchases in those territories will often have to be made at an artificial price level fixed by these folks' official pound, which disregards the normal monetary exchange rate. And the chance to sell food to the belligerents is very small except as a direct military benefit can be shown for them.

MARYLAND TRADE LAW—The highest court of Maryland decided that the legislators of that state tried to do too much in forbidding loss leaders or the sale of goods without a profit. This apparently does not in any way break down the federal law which permits manufacturers to contract with dealers regarding minimum prices of sale of their patented, trademarked, nationally advertised goods. It apparently does, however, give substantial advantage to that class of goods as compared with commodities not distinguished by any trademark or patent identification. Similarly, the state laws intended to support the federal act are apparently unaffected even in jurisdictions that choose to follow the Maryland court where they relate to such identifiable goods.

TAXES AS CONTROLS — Many members of Congress are still disposed to use the power of taxation as a means of accomplishing economic controls that probably could not be directly achieved in other legislation. Three examples are actively under study in Washington just now. The Patman Bill, proposing to exterminate great distributing chains by a large tax burden growing with time, is an outstanding example. And no other than the chairman of TNEC is sponsoring a proposal that all labor saving machinery be taxed by the government to create new jobs. As yet, none of this legislation seems certain of enactment. It pictures, however, a type of regulatory reasoning that may have important influence next year if the conservatives fail to gain control of Congress.

ECONOMY AND TAXES—The economy forces in Congress lost control of the appropriation situation during late March and early April. This means an increased threat of new taxes. And this concerns the food industries most because the idea of processing taxes is probably item No. 1 on likely new sources of federal income.



TECHNOLOGIST'S TOOL

The luximeter, used in determining the degree of pasteurization of milk, is also being used successfully in the laboratory of Loiza Sugar Co., Canovanas, Puerto Rico, to determine the clarity or turbidity of cane juices going to evaporators, and also of filtrate from the filter presses. A General Electric instrument, it consists of a light source, a light sensitive cell and an indicating instrument. The light is directed through a test tube of the solution to be measured.

Virginia Enacts Food Act

Virginia has revised its entire food act to conform with the federal. A "Virginia Food Act" was approved March 27 and becomes effective June 21, 1940. Its provisions on adulteration and misbranding follow the federal sections with the exception of an added exemption granted carbonated beverages in the matter of listing ingredients, provided the ingredients have been fully disclosed to the Commissioner of Agriculture in an affidavit.

Wallace Proposes Change In Standard for Tomatoes

Acting on a petition filed by National Canners Association, Secretary Wallace has proposed an amendment to the canned tomato standard to permit the use of any harmless calcium salt as an optional ingredient. And he set May 2 for a public hearing on the proposal. The proposed amendment reads:

"There may be added, for the purpose of preventing breakdown of tomato flesh or tissue, as the result of processing or shipment, the following optional ingredient: calcium chloride or other harmless calcium salt not in excess of 0.15 per cent by weight of total contents, based upon calcium."

The presence of such calcium salt would be stated on the label: "Calcium Chloride Added" or "With Added Calcium Chloride."

Two Food Hearings Canceled

Because the standards likely could not be completed before transfer of the Food and Drug Administration takes place, the standards hearings on dietary foods and flour, planned for late April and May, have been canceled. However, the Department of Agriculture expects to complete action on a number of definitions and standards upon which hearings have already been held.

MIT Offers Summer Course

Massachusetts Institute of Technology, Cambridge, will give a short but intensive course in food technology from July 1 to July 19, under the direction of B. E. Proctor, associate professor of food technology. The course will embrace certain of the processes of the milling, baking, meat packing, canning, dairy, fisheries, refrigeration and quick-freezing industries, as well as some of the food specialties such as vitamins. The tuition fee is $55, with a $5 registration fee.

John McDill Fox Dies

John McDill Fox, who has handled numerous food standards hearings for the Department of Agriculture, died at Washington April 18, following an operation for appendicitis. Mr. Fox was formerly dean of the law school of Catholic University and previous to his work with the Food and Drug Administration had served in other teaching positions and as a member of the legal staff of SEC.

Asparagus Canners Organize

Asparagus Canners Bureau has been organized in Chicago to deal principally with the problem of merchandising canned asparagus. L. Ratzesberger, Jr., Illinois Canning Co., Hoopeston, was elected president, and William R. Benner, of Streator (Ill.) Canning Co., was named secretary. The group will operate its office in conjunction with Corn Canners' Service Bureau.

Three Hearings Scheduled On Area of Production

Amendments of the Fair Labor Standards Act definition of "the area of production" are contemplated, three public hearings having been announced for the purpose of considering such amendment. The first hearing, announced for May 1, is to consider the application of area of production to the packing (but not canning) of citrus fruits. The second hearing, announced for May 6, will consider the definition of area of production as it applies to the handling, packing and storing (but not canning) of all perishable or seasonal fresh fruits and vegetables other than citrus fruits. The third hearing, to be held on May 9, will consider the definition of area of production as it applies to the drying and canning of perishable or seasonal fresh fruits and vegetables.

Answers to Food Law Questions

Interpretative Opinions from F&DA Letters to the Industry

Information given to trade inquirers, summarized below, further reveals the general policy of the Food and Drug Administration.

The following material continues the series of abstracts started in the April issue of FOOD INDUSTRIES, page 75.

Abstracts

27. Use of the word "*pure*" on a food label should be avoided where any question exists as to its interpretation. On a *combination* of food products, such as horseradish and beets, use of the word "pure" would certainly be inappropriate.

28. *Quantity of contents statement*, if *blown in the bottle*, should also appear on the label, because blown statement is so often inconspicuous.

29. *If vinegar is diluted* to any stated strength, the addition of *water* as an ingredient should be declared on the label. If stated to be a *compound* vinegar, the constituent vinegars must be declared.

30. Now that standards have been established for *tomato juice*, this ingredient when used as a packing medium for *canned tomatoes* may be so named, instead of using the term "strained tomatoes."

31. *Food colors* certified under the Food and Drug Act of 1906 may be considered as *certified* under the Food, Drug and Cosmetic Act of 1938 and therefor may be used.

32. *Label information* must be readily seen under "customary conditions of purchase and use."

33. *Shortenings* made by hardening a mixture of oils may be labeled "Hardened Vegetable (or marine or animal) Oils," as the case may be, declaring in addition any *non-fat* constituents. Use of *unaltered* animal fats or vegetable oils, however, would call for specific oil names. (See F.I., *11*, 283–340, 1939.)

34. *Labels on ice cream*, frozen custard, ice milk, milk sherbet, water ice or ice sherbet need not declare ingredients pending the establishment of standards (order effective for two years from May 4, 1939). (See F.I., *11*, 340, 1939.)

35. *Chewing gum labels* may omit *detailed* listing of gum base ingredients and plasticizing or softening ingredients, but other specific ingredients must be named. (Modified since F.I., *11*, 340, 1939.)

36. *Non-alcoholic carbonated beverages* need not declare ingredients pending the establishment of standards (order effective for "a *reasonable period* of time" after December 4, 1939). (See F.I., *1*, 66–69, 1940.)

37. "*Salad dressing*" is not a common or usual name for a limited class of salad dressings. A standard of identity for this class is not planned.. A *simplified* label declaration of ingredients is suggested. (See F.I., *2*, 73, 1940.)

38. *Preservatives* must be declared if used in amount sufficient to detect by the usual applicable tests.

39. Since ice creams may contain butter which includes *undeclared artificial color*, they need not declare artificial color. Sherbets and ices, not being made with butter, must declare artificial colors.

40. *All mandatory label information* should be placed on the *same* panel; this should be the principal *display panel* of an ice cream container. (See also F.I., *11*, 223, 1939.)

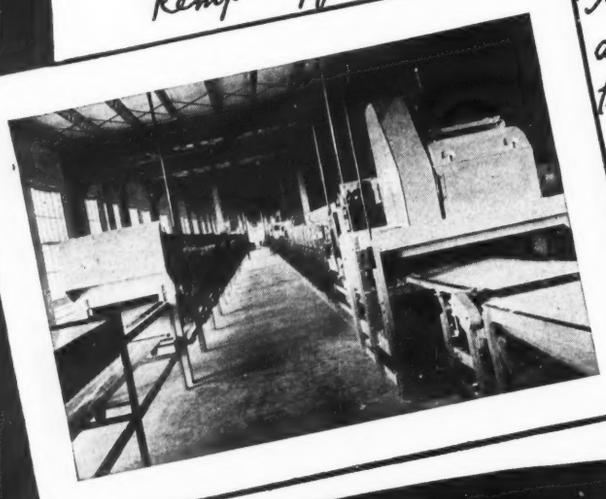
Tuesday

ar Bill—

Here's a snapshot of my new sweethearts—a couple of Greer Band Ovens, fired by the Kemp Industrial Carburator and Kemp Ribbon Flame Burners. They're 224 ft. long—each has 121 of these burners that are uniformly controlled + give even heat from side to side—and each oven puts out 2,000 to 3,000 # of baked goods an hour!

And say mister—I get more gas mileage than you do out of that new bus of yours—I'm getting a pound of baked goods for every blessed cubic foot of gas! Is that good, or is it GOOD?

Why don't you look into this Greer-Kemp combination for your new Atlanta Branch. Write the C. M. Kemp Mfg. Co., 405 E. Oliver Street, Baltimore, Md. a good bunch to know and told me a t of things saved me plenty—so



KEMP of BALTIMORE

41. Ice cream flavored with *vanillin* may be labeled "Vanilla Ice Cream, Artificially Flavored" pending establishing of standards. (See No. 34.)

42. The term *"Full Strength"* on a flavor or extract label is unnecessary. If not full strength, the flavor or extract would be classed as adulterated.

43. *An ice cream mix* for home consumption should not be called "ice cream" mix if the resulting homemade product is below the standard for *butterfat* content of ice cream in the state in which it is sold.

44. *Imported condensed buttermilk* intended for feeding *animals* is apparently not covered by the terms of the Federal Import Milk Act. However, it is a food product and therefore is under the Federal Food, Drug and Cosmetic Act jurisdiction.

45. *Riboflavin* (Vitamin G or B_2) in milk is apparently not destroyed by *ultra-violet radiation* of milk in commercial practice.

46. Use of the term *"Grade A,* the Standard of the Agricultural Marketing Service of the *U. S. Department of Agriculture* for HIGHEST QUALITY FOODS" would be *misleading* on canned food labels, by implication of government supervision or guarantee.

47. *Raw materials* used in food manufacture may not be purchased and shipped under *code designations* exempt from labeling requirements.

48. *Sample packages* are subject to the same labeling requirements as commercial size packages.

49. *Cheese component* of pimiento process cheese, in the absence of a standard for pimiento process cheese, should conform to advisory standard for process cheddar cheese pending promulgation of final standards.

50. Use of the term *"Butter-Nut"* when applied to ordinary white *bread* is capable of misinterpretation, and continued use must be on the sole responsibility of the shipper.

51. At least 8 per cent of *honey* should be used in "Honey Bread"; if less is used, the honey ingredient should not be *featured.*

52. The term *"Butter Cream Loaf,"* applied to *bread,* is unobjectionable if butter and cream are the sole shortening ingredients. Synthetic cream, made by emulsifying butter with fresh milk, may not be labeled "cream," however.

53. *Water,* if removed during baking process, need not be declared as a *bread* ingredient.

54. The term *"Butter Flavored Cookies"* is applicable only if sufficient butter is used to flavor the finished product and if ingredient statement shows that most of *shortening* used is other than butter. "Butter Cookies" should be shortened entirely with butter.

55. *Vitamins* in foods should be labeled in terms of units: vitamins A, B_1 and D in U.S.P. or International units (interchangeable), and vitamin G in terms of weight of riboflavin in a given quantity of the food (Sherman-Bourquin method). For vitamin E there are no generally accepted units yet.

56. Particular ingredients in *bakery* products may be labeled simply as "shortening," "leavening," "yeast nutrient" or "dough conditioner," unless such practice is found to result in denying the consumer the information which the law guarantees.

57. The mandatory information on an *ice cream* carton should appear on that panel to which the consumer's *attention* is focused; other panels should not be printed to attract attention.

58. *Tea bags* in retail unit carton need not be individually labeled if carton bears mandatory statements.

59. The term *"fresh"* is inappropriate on *butter* which has been kept in cold storage.

60. *Lecithin* is not a normal ingredient of *shortening*; it should be declared as an ingredient of a food in which shortening containing lecithin has been used.

61. *"True fruit flavors"* must be made from whole fruit or fruit juice; however, flavors made from *oils* of orange, lime or lemon are not artificial flavors.

62. The term *"Vitamin F"* is misleading and should not be applied to unsaturated *fatty acids* essential to nutrition.

63. The *manufacturer* of a commodity is the party who completes the manufacturing

operation; a *packer* may encapsulate or press into tablet form, but may not add any ingredients to the mix or place a coating of its own manufacture, without becoming a manufacturer.

64. *Tomato juice* seasoned with green *chili juice* may not be labelled "Tomato Juice"; the term "Tomato Juice Cocktail" would be appropriate, with a listing of ingredients.

65. Labeling of *confectionery* containing *dried egg* product should reveal the dehydrated nature of this ingredient.

66. *Frozen desserts* other than those exempted (see No. 34) must bear ingredient statement; if they contain an exempted product, this may be listed by its common name.

67. *Certified coal-tar colors* intended for use in food manufacture must comply with ingredient listing and other labeling requirements.

68. *All importations* of foods or drugs must be accompanied by Consular Form No. 197 or 198.

69. If an ingredient of an *imitation flavor* has no other common or usual name than a complex chemical name, some such term as "synthetic ester (or ketone or aldehyde)" would be more appropriate on the label.

70. Lemon pie or cake containing *"lemon emulsion"* may describe this ingredient as "Flavoring," unless the emulsion contains a solvent or vehicle not usually found in flavorings.

71. When onions and celery have been used to flavor a *broth* but have been removed before finishing the product, only "Flavoring" need be listed as an ingredient.

72. Canned *grapefruit* labels should state "Broken Sections" if such is the fact; "Fancy Hearts of Grapefruit" is not a suitable description of canned whole segments or sections of grapefruit.

73. *"Bouillon"* is a very definite name associated with stock made from a definite variety of meat or raw material.

74. *"Beans with Pork in Tomato Sauce"* is sufficient listing of ingredients for the usual tomato sauce; if other packing medium is used, declaration of ingredients is necessary.

SCHEDULE OF EVENTS

MAY

5 (week of)—Associated Retail Bakers of America, Jefferson Hotel, St. Louis

6-8—American Spice Trade Association, Hotel Astor, New York.

8-10—Millers National Federation, Edgewater Beach Hotel, Chicago.

9-10—American Oil Chemists Society, Roosevelt New Orleans.

12-18—National Carbonated Beverage Week.

13-14—National Cottonseed Products Association, Roosevelt Hotel, New Orleans.

13-15—Quality Bakers of America, Hotel New Yorker, New York.

16-17—Central Atlantic States Association of Dairy, Food and Drug Officials, Hotel Raleigh, Washington, D. C.

20-24—American Association of Cereal Chemists, Park Central Hotel, New York.

23-25—Rice Millers Association, Houston, Texas.

JUNE

3-6—National Confectioners Association of the United States, Waldorf-Astoria, New York.

3-7—Association of Operative Millers, Statler Hotel, Buffalo, New York.

9-11—American Association of Medical Milk Commissions, Hotel Roosevelt, New York.

9-11—Certified Milk Producers Association of America, Hotel Roosevelt, New York.

12-14—National Dairy Council, Edgewater Beach Hotel, Chicago.

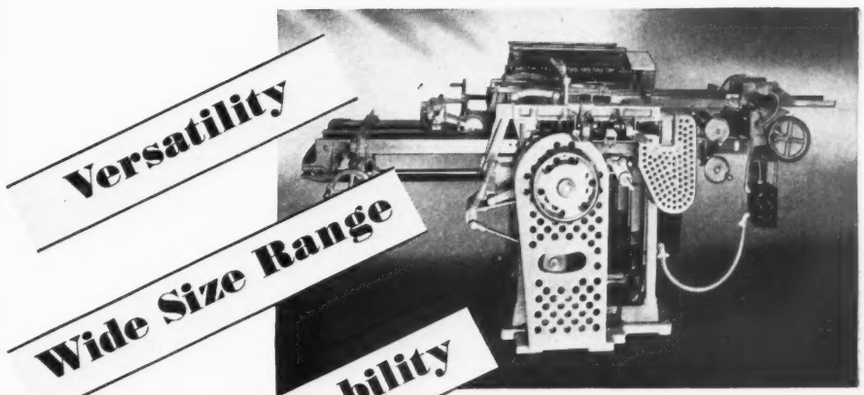
13-15—Associated Grocery Manufacturers of America, The Homestead, Hot Springs, Va.

17-19—Institute of Food Technologists, Morrison Hotel, Chicago.

24-25—National Macaroni Manufacturers Association, Edgewater Beach Hotel, Chicago.

24-26—Flavoring Extract Manufacturers Association of the U.S., Drake Hotel, Chicago.

3 Important Advantages



One FA type machine will wrap a wide range of sizes. The two groups of well-known packages shown above are examples of the work done by this machine.

OUR Model FA Machine has the versatility to wrap a great variety of products in many different styles of wrapping. Moreover, the machine has an extremely wide size range, and takes only 10 minutes to adjust for a different size, even when the change is in all three dimensions.

Manufacturers appreciate this convenient adjustability because it is the practical answer to the problem of wrapping a diversified line. In addition to ordinary cartons, the FA wraps open boats, extension-edge boxes and turned-up-side trays. It can also be designed to wrap extremely flat articles on cardboard, making crimped ends, heat-sealed.

The FA does an exceptionally neat and attractive job with any type of modern wrapping material. May be equipped with Electric Eye for accurate registration of printed material fed from a roll.

This remarkable machine is saving thousands of dollars for manufacturers in many different industries. It is considered by many to be the most outstanding machine on the market today. For convenient reference, you should have detailed information on this machine in your files.

Write for literature on the FA.

PACKAGE MACHINERY COMPANY

SPRINGFIELD, MASS.

NEW YORK CHICAGO CLEVELAND LOS ANGELES TORONTO

Mexico, D.F: Agencia Comercial Anahuac, Apartado 2303
Buenos Aires, Argentina: David H. Orton, Maipu 231
Peterborough, England: Baker Perkins, Ltd.
Melbourne, Australia: Baker Perkins, Pty., Ltd.

PACKAGE MACHINERY COMPANY

Over a Quarter Billion Packages per day are wrapped on our Machines

300 New Research Jobs

About 300 new positions for scientific and technical men are to be filled this summer or fall to make up the staffs of the new regional laboratories of the Department of Agriculture.

Chemists and chemical engineers interested in research positions of this type are invited to request from the Civil Service Commission, Washington, D. C., the necessary blanks on which to make their applications for eligibility. There will be no examination, but the individuals will be rated according to their experience and training and the references which they give. The positions open range in initial salaries from $2,600 to $4,600. Appointments will be made for service at Philadelphia; New Orleans; Peoria, Ill.; and Berkeley, Calif.

Dairies, Rice Millers Charged With Monopoly

Charges have been filed by the Federal Trade Commission that six corporations have combined to control prices and monopolize the supply of foreign type cheese made in Wisconsin. And the Commission has issued a formal complaint naming the companies: National Dairy Products Corp., New York; Borden Co., New York; Kraft-Phenix Cheese Corp., Chicago; Badger-Brodhead Cheese Co., Monroe, Wis.; J. S. Hoffman & Co., Chicago; and Triangle Cheese Co., Monroe, Wis.

It is alleged in the complaint that Borden and Kraft, the latter acting for National Dairy, have driven all independent dealers out of the Monroe area. Prices to be paid the Monroe area cheese factories are said to have been set at monthly meetings of the respondents. The FTC also claims that the respondents take the foreign type cheese output of 200 of the 250 cheese factories in that area.

The Commission has also been after some of the rice millers with a modified cease and desist order of early April, seeking to stop some of their alleged "conspiracies in restraint of trade."

Construction News

	Pending (thousands)	Awarded April (thousands)	Total Awarded 1940 (thousands)
Bakery	$520	$100	$280
Beverages	1,270	376	2,299
Canning and Preserving	80	.....	.....
Cold Storage Plants	415	75	276
Confectionery	150	400	175
Grain Mill Products	220	400	765
Ice Manufactured	150	.....	80
Meats and Meat Products	425	100	432
Milk Products	355	.....	724
Miscellaneous	320	240	2,385
	$3,905	$1,691	$7,416

Rules for Tuna Industry Issued by Government

Trade practice rules for the tuna industry were promulgated by the Federal Trade Commission on March 22. And a hearing was called for April 25 to modify slightly the definition of "fancy tuna."

The trade rules for the industry, which packs products with a sales value of $20,000,000 annually, relate to the sale and distribution of tuna and tuna products. They set up definitions for "fancy" and "standard" tuna and "tuna flakes" and outlaw deceptive designations; concealment of species and quality; misuse of "extra fancy", "extra select," etc.; misrepresentation of industry products in general; deceptive depictions; misrepresentation of "tonno," foreign insignia, etc.; imitation of trademarks and trade names; use of slack-filled containers; defamation of competitors or their products; substituting inferior products for those ordered; misuse of "free"; fictitious prices; false invoicing; inducing breach of contract; commercial bribery; enticing away employees of competitors; unfair threats of infringement suits; unfair consignment distribution; unfair selling below cost; discriminatory prices, service, etc.; and unlawful interference with raw material purchases.

Mexico Takes Chicle Land From Foreign Companies

Mexico's efforts to eliminate foreign ownership and management have now reached one food product raw material. The government charges that ownership of chicle lands, some of which have been managed for 35 or 40 years, has never been legal. On this ground it is taking over from American and other foreign managements the properties without compensation.

Form Frosted Food Group

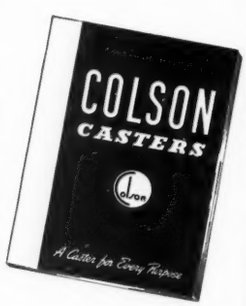
Frosted Foods Association has been organized with the intention of assisting in the establishment of standards for the industry and of working out production and distribution problems. John J. Antun, of Merchant's Refrigerating Co., New York, is president of the new association.

Can Sizes Are Revised

Experience in the 1939 packing season indicated that a few changes would be desirable in the list of can sizes submitted on July 1 by the Simplified Practice Division of the Bureau of Standards.

These changes, announced March 30, include the deletion of five sizes which had been recommended for corn on the cob and the addition of a new size for baked beans. Restriction was also taken off the vertical dimension and volume of individual juice cans for tomato, apple, grapefruit, orange,

Send for this complete Colson caster catalog. It will simplify your selection of casters for any equipment.



FROM the smallest to the largest, Colson casters are built to *quality* standards. Because casters are not costly—it pays you to buy the best. You'll find Colson casters will serve you long—roll easily—and pay you well wherever a caster is needed. Make your selection from the Colson Caster Buying Guide—mailed on request.

THE COLSON CORPORATION
ELYRIA, OHIO
Offices and Agencies in Principal Cities
CASTERS • INDUSTRIAL TRUCKS AND PLATFORMS • LIFT JACK SYSTEMS

lemon, lime and other vegetable or fruit juices. The total number of can sizes recommended is now reduced to 41, counting the unrestricted individual juice cans as one size.

Smaller Crops Expected

April 1 reports of the Agricultural Marketing Service indicate rather low yields of four of the five crops reported upon. Winter wheat is the only crop for which an actual yield estimate was given. At 426,215,000 bu., this crop estimate is one of the lowest for winter wheat in the last 40 years and compares to a yield of 563,431,000 bu. in 1939. Rye condition was given at 69, compared to a 1929-1938 average for April 1 of 77, pasture at 71 compared to 74, early potatoes at 76 compared to 77. In contrast, peach condition on April 1 was reported at 75 compared to an average of 63 for the date in 1929-1938.

Laws Block Food Exports

Blitzkreig in Denmark has raised unwarranted hopes of increased butter, eggs and pork products exports to the Allied countries. Much increase over present exports of these commodities to the belligerents is unlikely, however, at least for the immediate present. Laws, such as the Johnson and Neutrality Acts, prevent loans to Great Britain and France. Because of this, the Allies at present intend to use their funds in the United States for the purchase of airplanes and munitions and food will continue to come, in the main, from the British and French Empires and from countries like Argentina where restrictions are less.

Data for the Charts

In preparing the curves shown on this and the succeeding page of FOOD INDUSTRIES, data were obtained from the following sources: Prices received by farmers, U. S. Department of Agriculture; employment, payrolls, wholesale and retail prices, U. S. Department of Labor; cost of living, National Industrial Conference Board; commodity price index, *N. Y. Journal of Commerce;* business activity index, *Business Week;* fats and oils index, Bureau of Raw Materials for American Vegetable Oils and Fats Industries.

Fats and Oils Use Higher

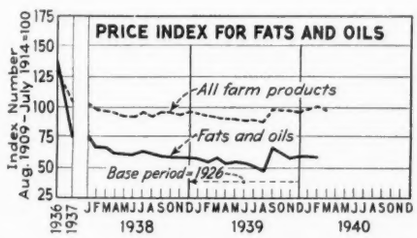
Factory consumption of all fats and oils in the United States in 1939 totaled 4,803,000,000 lb., according to the Bureau of the Census. This figure exceeded the consumption of all other recorded years except 1937, which was 3 per cent greater, at 4,964,000,000 lb. Of this 1939 total, 43 per cent was used in the manufacture of shortening, oleomargarine and other edible products, a total of 2,074,000,000 lb., compared to 2,205,000,000 lb. in 1938 and 2,346,000,000 lb. in 1937 for edible products.

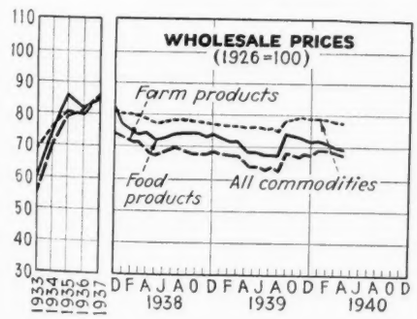
Use of fats and oils by the shortening industry declined for the fourth year in succession, being 7 per cent below the 1938 figure and 13 per cent under the 1936 record of 1,614,000,000 lb. Consumption of fats and oils in margarine also declined in 1939, falling 22 per cent below 1938 and 25 per cent under the 1937 record of 325,000,000 lb.

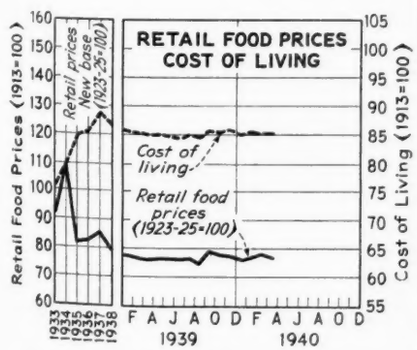
In contrast, use of fats and oils in other edible products rose to a new record of 426,000,000 lb., 2 per cent over the 1937 record, and 13 per cent above 1938.

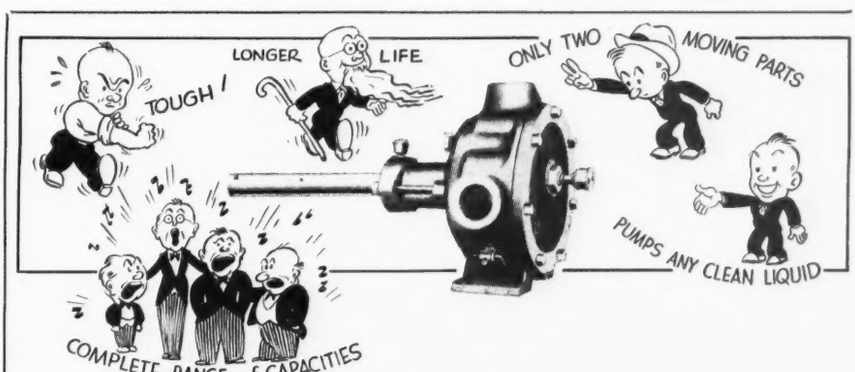
Commodity Prices Up

Spread of war to Norway and Denmark was marked by a sudden rise in the general level of commodity prices and little movement thereafter. On April 6th, before the lid blew off, the *N. Y. Journal of Commerce* general index stood at 79.3, about where it had been for a month. On April 13 this index stood at 81.2, up 2.4 per cent. During the same week, the same publication's index of grain prices rose from 76.0 to 78.7 and the index for food prices increased from 65.2 to 70.3.









ALL Viking Rotary Pumps have just 2 moving parts . . . capacities range from ½ to 1,050 GPM . . . Viking rotates in BOTH directions . . . efficiently handles tomato juice, milk and cream, molasses, catsup and all other similar Dairy and Food Factory products . . . complete selection of portable and stationary models with special metals, mountings and drive arrangements . . . write for complete information—bulletins will be hurried back by return mail.

VIKING PUMP CO.
CEDAR FALLS, IOWA

Among individual commodity price increases recorded in that same week were wheat from $1.01½ to $1.04½, flour from $5.75 to $5.90, corn from 58½c. to 61½c., beef from 14c. to 15½c., pork loins from 11½c. to 17c., lard from $6.25 to $6.60, and cocoa from $5.80 to $5.94.

Crop Acreages Reported

Prospective plantings for 1940 of some of the most important crops have been announced by the U.S. Department of Agriculture. Decrease in corn acreage and increase in spring wheat plantings are the most important changes. Some of the significant figures follow:

Product	Proposed 1940 Acreage	1939 Acreage
Corn	87,770,000	91,501,000
Spring Wheat	19,425,000	17,532,000
Oats	35,818,000	35,512,000
Barley	14,606,000	14,545,000
Potatoes	3,103,000	3,069,000
Sweet Potatoes	843,000	862,000

INDICATORS

CONFECTIONERY and competitive chocolate products sales in February, 1940, were $21,344,000 compared to $19,001,000 in February, 1939, an increase of 12.3 per cent.

FLOUR PRODUCTION in March, 1940, by mills representing about 64 per cent of total U. S. flour production, amounted to 5,480,598 bbl., according to *The Northwestern Miller*. The corresponding figure for March, 1939, was 5,919,391 bbl.

HOG SLAUGHTER, Federally inspected, in March, 1940, was 3,981,165, the highest since 1933. In March, 1939, the number was 3,229,120 hogs.

PORK in storage in Chicago on March 31, 1940, was 100,913,818 lb., compared to 70,332,401 lb. a year before.

CORN PACK in 1940 will be limited to 15,000,000 cases, if the present move to restrict planting and normal growing weather obtains.

PEA ACREAGE for canning planned for this year is now said to be from 25 to 30 per cent greater than in 1939, and about equal to 1938 acreage.

ASPARAGUS PACK in California in 1940 is limited to 2,175,000 cases, by agreement between growers and canners.

OYSTERS CANNED in 1939 totaled 615,976 cases (on a basis of 48 five-ounce cans per case), compared to 482,441 cases in 1938, according to the Bureau of Fisheries.

GREEN AND WAX BEAN ACREAGE for canning in 1940 is expected to exceed 1939 plantings by 8 per cent, and total 57,770 acres.

SALMON CANNED in the U. S. in 1939 totaled 5,991,999 cases, according to the most recent figures of the Bureau of Fisheries. This compares to 7,279,719 cases canned in 1938.

BUTTER, CREAMERY, produced in February, 1940, totaled 125,265,000 lb., according to the Agricultural Marketing Service. This was 3 per cent above production in February, 1939, and 13 per cent greater than the 1930-1938 average for February.

CHEESE PRODUCTION, American, in February, 1940, was 32,780,000 lb., a new record for the month, 18 per cent greater than the February production last year and 33 per cent over the 1930-1938 February average.

EVAPORATED AND CONDENSED MILK produced in February, 1940, totaled 173,964,000 lb., compared to 142,866,000 lb. in February, 1939.

OLEOMARGARINE SALES in February, 1940, as indicated by sales of internal revenue stamps, were 29,742,014 lb., 11 per cent above the sales in February, 1939.

COTTONSEED OIL consumption in March, 1940, was 243,087 bbl., compared to 213,350 bbl. in February and to 306,613 bbl. in March a year ago.

COFFEE deliveries to the U. S., first nine months of crop year (July 1939 through March 1940) were 10,424,015 bags, a new high record.

FROZEN FRUITS in storage on April 1, 1940, totaled 90,002,000 lb., compared to 91,160,000 lb. on April 1, 1939, and to a 1935-1939 average of 70,569,000 lb. for the date.

FROZEN VEGETABLES in storage on April 1, 1940, amounted to 55,840,000 lb., against 51,293,000 lb. a year previous.

BUTTER, creamery, in storage on April 1st of this year totaled 8,856,000 lb. The quantity a year before was 78,909,000 lb. and the average for the date was 22,249,000 lb. in the years 1935-1939.

CHEESE, all kinds, in storage on April 1, 1940, amounted to 75,270,000 lb., compared to 81,653,000 lb. one year previous and to 76,143,000 lb. as a 1935-1939 average for the date.

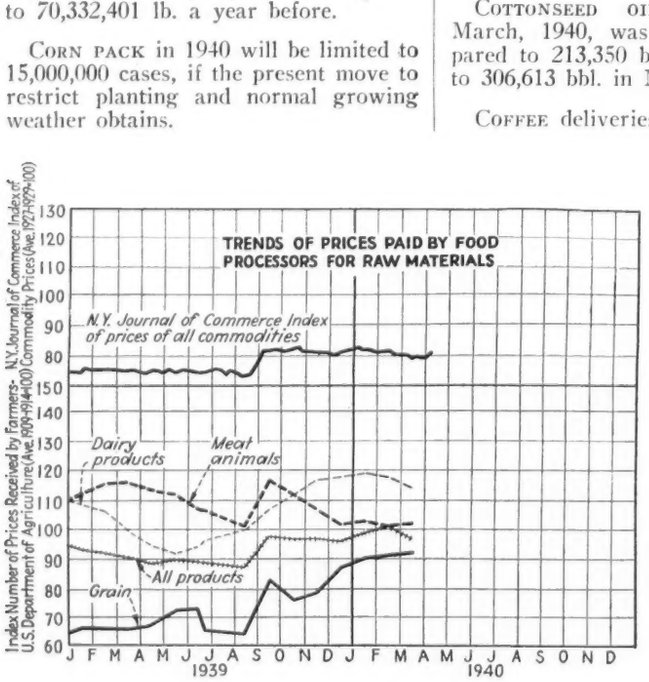
EGGS, case equivalent, in storage on April 1, 1940, totaled 2,110,000 cases, compared to 2,833,000 cases on April 1, 1939, and to an average of 2,915,000 cases for April 1 in the years 1935-1939.

POULTRY, all kinds, in frozen storage on April 1 of this year amounted to 115,447,000 lb. The quantity a year before was 90,987,000 lb. and the April 1 average in 1935-1939 was 88,669,000 lb.

MEAT, all kinds, in cure and frozen storage on April 1, 1940, was 831,437,000 lb., compared to 629,096,000 lb. on April 1, 1939, and to an average of 745,013,000 lb. on April 1, 1935-1939.

LARD in storage on April 1 of this year totaled 269,284,000 lb. The figure one year before was 129,252,000 lb. and the average for April 1 in the years 1935-1939 was 129,909,000 lb.

WEEKLY FOOD INDEX of Dun & Bradstreet, Inc., stood at $2.30 on April 9, compared to $2.28 in the preceding week and also in the corresponding week of 1939.


TRENDS OF PRICES PAID BY FOOD PROCESSORS FOR RAW MATERIALS
N.Y. Journal of Commerce Index of prices of all commodities
Dairy products
Meat animals
All products
Grain
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N.Y. Journal of Commerce Index of Commodity Prices (Ave. 1927-1929=100)
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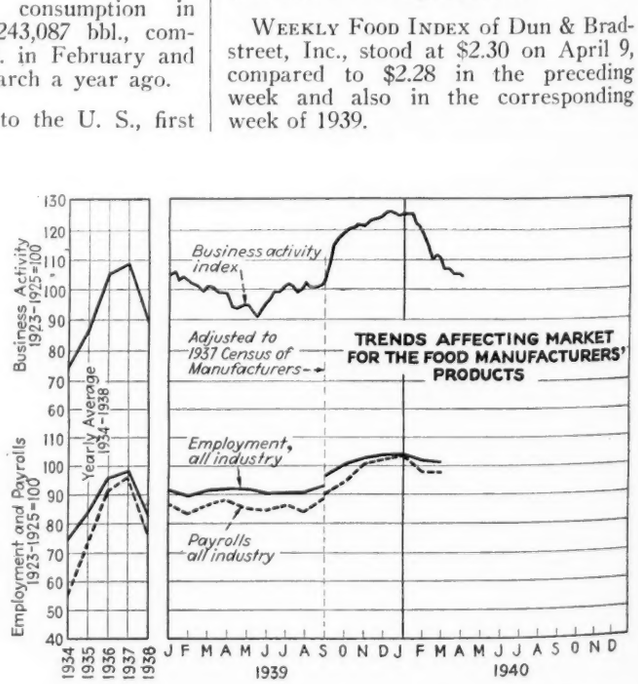
1939
1940


Business Activity 1923-1925=100
Employment and Payrolls 1923-1925=100
Yearly Average 1934-1938
1934
1935
1936
1937
1938
Business activity index
Adjusted to 1937 Census of Manufacturers
TRENDS AFFECTING MARKET FOR THE FOOD MANUFACTURERS' PRODUCTS
Employment, all industry
Payrolls all industry
J F M A M J J A S O N D J F M A M J J A S O N D
1939
1940

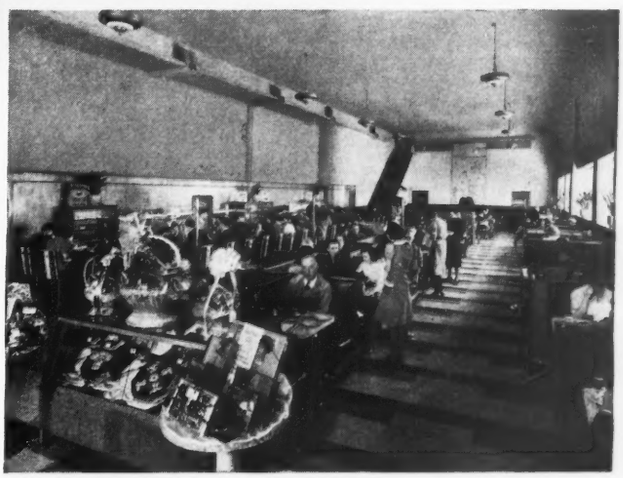
Candy-making operations in Albert Sheetz Mission Candy Co. store in Hollywood, California.

From Hollywood . . .

Candy!

Thanks to quick, clean

GAS Fuel



One of 30 busy stores and restaurants under a single management, depending on Gas-fired equipment for speed, volume.

FIVE thousand pounds of candy a day—this is what the busy Hollywood store of the Albert Sheetz Mission Candy Company, San Francisco, can and does produce—chocolates, caramels, coated nuts. This store is a unit supplying 30 stores and restaurants of the company, stretching from Santa Barbara to San Diego.

Speed, plus volume, comprise the answer to this company's success. Says Chief Engineer B. McFaul: "Only Gas fuel could give us the speed to handle such volume." Three "blast furnaces" are direct Gas-fired; an efficient Gas boiler supplies four steam-jacketed kettles.

In any branch of the food industries—where uniformity of product, labor and fuel economies, and clean, speedy heat are important—Gas-fired equipment will help you. For Gas is dependable, automatic, worry-saving, convenient, and cuts down spoilage. Look into the advantages Gas can give your plant.

AMERICAN GAS ASSOCIATION

INDUSTRIAL GAS SECTION

420 LEXINGTON AVENUE, NEW YORK CITY

Men, Jobs & Companies

INDUSTRY

Bellecenter (Ohio) Creamery & Cheese Co. will construct a $75,000 building for converting whey, a cheese byproduct, into a sugar used in baby foods.

Borden Co., New York, has purchased Hoekstra Dairy Products Co., Grand Rapids, Mich. William Hoekstra will remain as manager.

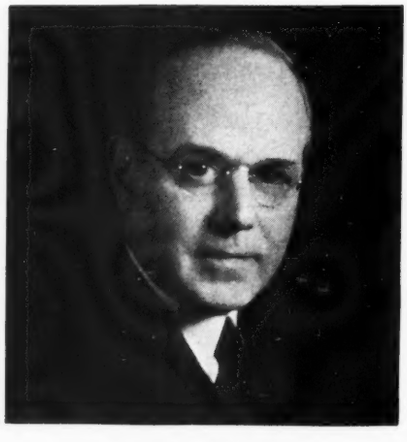
Bunte Brothers is building a new warehouse with 30,000 sq. ft. of space, at an estimated cost of $125,000. The warehouse, which will adjoin the Chicago factory, will be refrigerated, thus enabling the company to lessen seasonal variations in employment that have resulted from the perishable nature of the manufactured products.

Carnation Co., Ltd., Aylmer, Ont., is planning to construct an evaporated milk plant at Sherbrooke, Que., to cost $50,000.

W. L. CAMPBELL

L. E. HURTZ

JOHN McKINLAY



BURT J. DICKENS

W. L. Campbell, *general manager of manufacturing of Kroger Grocery & Baking Co., Cincinnati, has been elected a director and vice-president.*

John McKinlay, *has vacated the position of chairman of the board of National Tea Co., Chicago, to become president.*

L. E. Hurtz, *executive vice-president of Fairmont Creamery Co., Omaha, has succeeded E. F. Howe as president. Mr. Howe has been named chairman of the board.*

Burt J. Dickens *has been advanced from vice-president of National Tea Co. to executive vice-president.*

Coca-Cola Bottling Co., Indianapolis, will build a $250,000 addition, comprising two stories and full basement.

Coca-Cola Bottling Co., Louisville, Ky., will construct a two-story plant of brick and stone construction, 200x250 ft.

Colonial Baking Co. will build a bakery and distributing plant at Augusta, Ga., at an estimated cost of $200,000.

Gary Beverage Co. has sold its plant building in Charlotte, N. C., to Seven-Up Bottling Co. But, through a lease on a new plant, it will retain operations in that city. Gary Beverage Co. also operates in High Point and Raleigh and recently opened a new plant at Greenville, N. C. The company has originated a beverage called "Tip."

Kentucky Macaroni Co., Louisville, is planning to construct a five-story and basement plant, 100x143 ft.

Kraft Cheese Co., Chicago, is planning to build a brick and steel warehouse and office at Cleveland, Ohio, to cost approximately $50,000.

Libby, McNeill & Libby is experimenting with the freezing of Hawaiian pineapple juice.

Loft, Inc., Long Island City, N. Y., has completed segregation of its candy and beverage business. Loft Candy Corp. has been formed, while Loft, Inc., has become chiefly a holding company with the Pepsi-Cola stock as its chief asset.

Charles Nunn & Sons Milling Co., Evansville, Ind., has built a new diesel power and light plant, a three-story storage building and offices. New machinery has been installed, including three high-speed flour sifters, and production has been increased to 300 bbl. of flour daily.

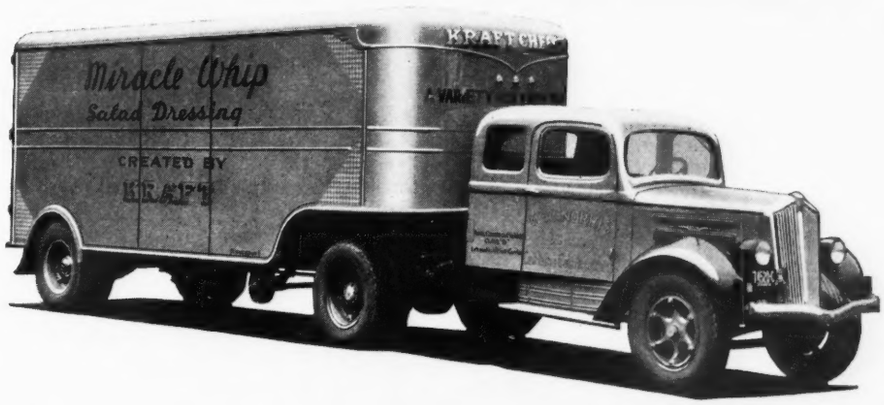
Geo. M. Peet Packing Co., Chesaning, Mich., will build a three-story, L-shaped packing plant of brick, steel and concrete, 40x40x100 ft., to cost about $75,000.

Rochester (N.Y.) Packing Co., Inc., will construct a large addition to its plant, to cost more than $50,000 with equipment.

Southern Biscuit Co., Inc., is building a two-story addition, 330x76 ft., to its plant at Richmond, Va., which will

WHAT IS A TRUCK-TRAILER?

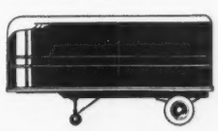
AND HOW DOES IT SAVE ON HAULING COSTS?

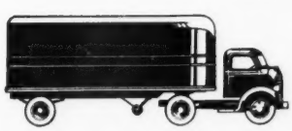


THE ANSWER IS AS SIMPLE AS ABC AND SAVINGS FOR OWNERS ARE CERTAIN!

1 This is a truck chassis. It can be used either to *carry* or *pull* loads.

2 Here is a modern Fruehauf Trailer. Fruehaufs are in use in more than one hundred lines of business.





3 Couple the truck to the Fruehauf Trailer and you have a Truck-Trailer with which you can haul 3 or 4 times as much because the truck can *pull* far more than it can *carry*.

You save on first cost since you can use a smaller truck to *pull* a given load. The cost of the small truck and Fruehauf Trailer is usually one-third less than a big truck which *carries* the entire load.

The smaller truck costs less to operate than a large one—as much as 30% less. Your upkeep will be less for the smaller truck—savings may be as high as 35%.

Your depreciation will be less because the smaller truck costs less to buy and to replace—less to write off each year. A Fruehauf Trailer lasts 10 years or more—write-off yearly is extremely small.

You can save still more by a "shuttle" operation. Leave only the Trailers to be loaded or unloaded. Use the truck continuously to *pull* first one and then another of the Trailers ready to be moved.

The Fruehauf Truck-Trailer story is one of savings from start to finish. The booklet "Executive Thinking" tells all.... It is yours upon request.

Thanks to motor trucks, fresh fruits, vegetables, seafoods and other perishable foods are now available to communities of every size the year 'round. Living standards have been raised and costs of living have been reduced.

★ The World's Oldest and Largest Manufacturers of Truck-Trailers ★

FRUEHAUF TRAILER COMPANY, DETROIT

SALES AND SERVICE IN PRINCIPAL CITIES

FRUEHAUF TRAILERS

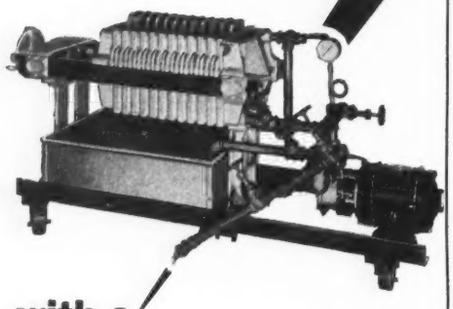
FRUEHAUF TRAILERS

"Engineered Transportation"

REG. U. S. PAT. OFF.

MORE FRUEHAUF TRAILERS ON THE ROAD THAN ANY OTHER MAKE

You Can't Filter Doughnuts or Potato Chips but You Can Recover the **COOKING OIL**



with a

SHRIVER FILTER

Many other products such as nuts or olives are not filtered but the oil or brine or other liquid medium in which they are processed or preserved should and can be saved.

Removing solids from cooking oils permits longer use of clear, fresh oil and leads to important savings. Shriver Filters with or without filter aids or bleaching compounds (as required) now make it possible for you to save what you have formerly regarded as normal waste. That applies equally well to the recovery of sugar syrups from hard candy or chocolate; cocoa butter; or edible oils from bleaching clays.

Many Other Possibilities

There are many other possibilities for extracting by-product profits from what is now waste. Shriver Filters have proved it in dozens of cases. How about yours?

Let our laboratory test this proposition on your product—without cost to you.

T. SHRIVER & COMPANY

860 Hamilton St. Harrison, N. J.

Western Agent—The Merrill Co.
343 Sansome St. San Francisco, Calif.

FOR BETTER QUALITY
Shriver FILTERS
RECOVER SOLIDS · CLARIFY · DECOLORIZE

enable the bakery to double its output. The company has found it necessary of late to operate on a 24-hour schedule.

Swift & Co., Chicago, has purchased the plant of Purity Ice Cream Co. at Dallas, Tex., and will transfer the present location in Dallas to the Purity plant after enlargement and modernization. Swift is also constructing a $200,000 addition to its soybean mill at Champaign, Ill., and is completing a dog food manufacturing plant in Omaha.

Ward Baking Co., New York, has modernized its delivery operations in eleven major cities through the purchase of 211 air-cooled, rear-engine drive vehicles. It is claimed that a 20 per cent reduction will be made in the time required to complete a given route.

PERSONNEL

Ellsworth Bunker, executive vice-president of National Sugar Refining Co., New York, has been elected president. Charles D. Bruyn, who was president, has become chairman of the board. Earl B. Wilson was elected a vice-president.

H. A. Burgers has succeeded Joseph F. Leete as president and general manager of Industrial Sugars Corp., Chicago. Mr. Burgers was formerly general manager of Insular Sugar Refining Corp. of the Philippine Islands. P. C. Taileton, who was with United States Sugar Corp. of Florida, was named plant superintendent of Industrial Sugars to succeed N. Fuad.

George A. Crapple, of the research department of Wilson & Co., Chicago, has been placed in charge of control and branch plant laboratories and has been made assistant director of research, succeeding Ellery H. Harvey, resigned.

Mrs. Alice B. Day has been appointed director of consumer relations of Rockwood & Co., Brooklyn, N. Y.

Brig. Gen. Walter A. DeLamater, former administrator of the Civil Works Administration of New York City, has been elected president and a director of American Beverage Corp., Brooklyn, N. Y.

James A. Hamilton, general branch house and car route manager of Wilson & Co., Chicago, has been made a vice-president.

H. M. Hannum has been named manager of the plant operations division of Kingan & Co., Indianapolis. J. W. McElligott, who recently resigned as vice-president in charge of sales of Cudahy Packing Co., Chicago, was appointed general sales manager.

A. W. Langfield, of Frozen Food Distributors, Inc., Oakland, has been elected chairman of Frosted Food Institute of California for 1940.

Victor T. Norton has been appointed vice-president of Cudahy Packing Co., Chicago, and will supervise the merchandising and distribution of product through the company's branch house and car route sales organizations. Vice-presidents J. W. McElligott, in charge of sales, and D. J. Donohue, head of the merchandise department, have resigned.

Clarence A. Quealey, formerly Nashville branch manager of Shefford Cheese Co., Green Bay, Wis., has become general sales manager.

T. N. St. Hill has been elected president of Tea Garden Products Co., San Francisco, which returns the management of the company to members of the family who founded the firm 55 years ago. He replaces A. E. Philips, resigned.

Crosby J. Seybolt, Cincinnati manager of Standard Brands, Inc., New York, has succeeded the late Albert J. Leahey as manager of the New York division.

H. M. Smith has replaced George A. Black as Minneapolis district manager of General Foods Corp., New York.

Arthur R. Wendell has advanced from vice-president and treasurer of Wheatena Corp., Rahway, N. J., to president. He succeeds William L. Culbert, who has become chairman of the board. George B. Wendell, Jr., was made first vice-president.

Irving J. Woodin has been appointed general manager of California Fruit Exchange, succeeding the late John L. Nagle.

ROBERT G. GOULD

Mr. Gould, who was managing editor of* FOOD INDUSTRIES *from its inception in October, 1928, until August, 1930, died March, 30, in Washington, D. C., after a prolonged illness. Mr. Gould was at one time owner and publisher of a Chicago food paper.

DEATHS

William B. Griscomb, 72, vice-president of Abbotts Dairies, Inc., Philadelphia, March 23. He had been associated with the company 38 years.

William Horlick, Jr., 65, chairman of the board and treasurer of Horlick Malted Milk Co., Racine, Wis., April 1. An elder brother, Alexander, is president of the company, which was founded by their father in 1875.

Carl W. Hunding, 41, vice-president of Hunding Dairy Co. and president of Associated Milk Dealers, Inc., Chicago, April 2.

James G. McDonald, 75, founder of J. G. McDonald Chocolate Co., Salt Lake City, recently. He began manufacturing candy at the age of 18.

James H. Russell, an official of Curtiss Candy Co., Chicago, March 31. His daughter, Mrs. Otto Schnering, is the wife of the president of the company.

Robert O. Seeley, 59 vice-president of W. R. Roach Canning Co., Grand Rapids, Mich., March 27. He had devoted 43 years to the canning business.

Lloyd Skinner, 60, president and general manager of Skinner Manufacturing Co., Omaha, Neb., March 16.

William J. Stange, 69, president of Wm. J. Stange Co., Chicago, March 21, in Los Angeles. He became identified with the flavor and essential oil business in 1889. He was a charter member of Flavoring Extract Manufacturers' Association of the United States.

ASSOCIATED INDUSTRIES

Consolidated Products Co., Inc., New York, is liquidating the plant of American Soya Products Co., Evansville, Ind.

Food Research Laboratories, Inc., New York, has moved to a new and larger laboratory building in Long Island City, N. Y.

James F. Lincoln Arc Welding Foundation, Cleveland, is sponsoring a $200,000 Industrial Progress Program for reports describing advances and improvements by application of arc welding to industrial work. There will be specific awards made in the food field.

George S. May Business Foundation, Chicago, has been organized on a non-profit basis to conduct studies into problems of business management.

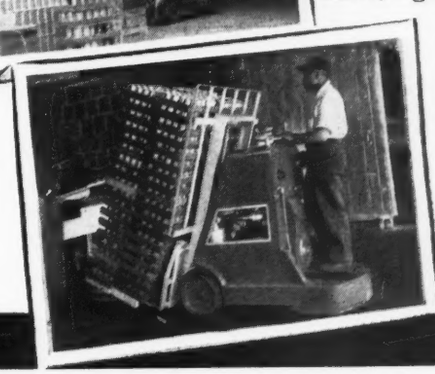
Merck & Co., Rahway, N. J., has issued a brochure on the use of crystalline vitamin B_1 in foods.

FARES SLASHED 1/2
Via MOBILIFT Streamliner

ALL ABOARD for the newest, fastest, most economical method of handling that ever entered the cannery field. MOBILIFTS are a boon to those operating on the "narrow margin" basis. Many progressive canners have discovered this new method of handling reduces costs over half and are ordering more MOBILIFTS for this year's operation.

Run YOUR pack through this year on the "half fare" basis and bank the difference. Write the factory and we'll show you what users, right in your own territory, claim that MOBILIFTS have done for them.

MOBILIFTS cost less than 25c an hour to operate, designed with special forks for cannery use. MOBILIFTS are light in weight (approx. 2600 lbs.) Prices begin around $1000 at factory, carry up to a ton and lift up to a 14 ft. ceiling. Write Vaughan Motor Co., 845 S. E. Main, Portland, Ore., for actual cases, figures and nearest dealer.



MIGHTY MIDGET MOBILIFT

Just off the Press

BOOKLETS • LITERATURE • BULLETINS

Food Plant Equipment

BRANDING—Vol. 4, No. 1, of "Thwing's Foundry Visitor", issued by Thwing-Albert Instrument Co., 3336 Lancaster Ave., Philadelphia, Pa., deals with the Everhot Manufacturing Co., Maywood, Ill., manufacturer of gas, gasoline and electrically heated branding equipment and hot ink branders.

CANNING EQUIPMENT — General Catalog No. 40, of F. H. Langsenkamp Co., Indianapolis, Ind., features a complete line of machinery and supplies for canning plants, with tables of information, specification data, illustrations and index.

CONVEYORS—The Alvey-Ferguson Co., Oakley Station, Cincinnati, Ohio, has issued a 58-page illustrated catalog showing typical conveyor installations in various food plants.

CUTTING MACHINES—Vegetable and fruit dicing and cubing machines are described and illustrated in a 4-page folder of J. P. Anderson & Co., Ninth and Thompson Sts., Philadelphia, Pa.

FILLING MACHINERY—The Karl Kiefer Machine Co., Cincinnati, Ohio, describes various automatic fillers in a 4-page folder entitled "Good News for 1940".

MATERIALS HANDLING—Recent publications of The Jeffrey Manufacturing Co., Columbus, Ohio, include: Catalog 730 on the "Mass-Flo" conveyor, a single unit for handling a wide variety of granular materials, and Booklet 733, "What We Make", illustrating various types of materials handling equipment, chains, transmission and reduction machinery.

MATERIALS HANDLING—Over 175 materials handling equipment items are covered in 56-page illustrated Catalog No. 21 by Lewis-Shepard Sales Corp., Watertown, Mass.

MILK PACKAGING—Pure-Pak "Junior" milk-packaging machine and Pure-Pak containers are discussed in two recent bulletins of Pure-Pak Division, Ex-Cello Corp., 1216 Oakman Blvd., Detroit, Mich.

MIXING EQUIPMENT—"Lightnin'" nozzle mounting top entering mixers are included among 50 different types of mixing equipment illustrated by Mixing Equipment Co., Inc., 1090 Garson Ave., Rochester, N. Y., in 16-page Form B-68.

OVENS AND DRYERS—Catalog No. 107 of The Gehnrich Corp., Long Island City, N. Y., covers a complete line of industrial ovens and dryers for curing and baking meat products and other foods.

PROCESSING EQUIPMENT—Continuous process equipment for mayonnaise and salad dressing emulsification in a two-stage operation is described in 8-page illustrated Bulletin No. 795, by The Pfaulder Co., 89 East Ave., Rochester, N. Y.

SAUSAGE CUTTERS—The Cincinnati Butchers' Supply Co., 2145 Central Ave., Cincinnati, Ohio, suggests the use of "Boss" machines including cutters, grinders and stuffers to get the most out of the sausage campaign.

WHEAT CONDITIONING — "Why Condition Wheat", title of illustrated booklet of Forster Mfg. Co., Wichita, Kan., discusses control of moisture in wheat.

Plant Accessories and Supplies

AIR DUCTS—Forty-four reasons for preferring "Careyduct" all-asbestos air duct are listed in a recent illustrated bulletin by The Philip Carey Co., Inc., Cincinnati, Ohio, giving accessory data, list prices and dimensions.

BEARINGS — "Why Anti-Friction Bearings", issued by New Departure Division, General Motors Sales Corp., Bristol, Conn., deals with factors to be considered in the selection of anti-friction bearings.

BRONZE BEARINGS — A complete stock list of all types of sleeve bearings is made available in 76-page illustrated Catalogue 400 of Johnson Bronze Co., New Castle, Pa.

CASTERS AND WHEELS—A complete line of casters, wheels, glides, desk shoes and accessories are described and illustrated in 192-page "Caster & Wheel Manual", No. 38, of Darnell Corp., Ltd., Long Beach, Calif.

DEEP WELL PUMPS—Roots-Connersville Blower Corp., Connersville, Ind., has issued Bulletin 260-B15, covering its auto-jet line of deep well water pumps for lifts up to 190 ft.

DRIVE BELTS—A complete 24-page illustrated catalog on tension welded leather belting, modern group drives and individual machine drives, has been published by Chicago Belting Co., Green & Washington Sts., Chicago, Ill.

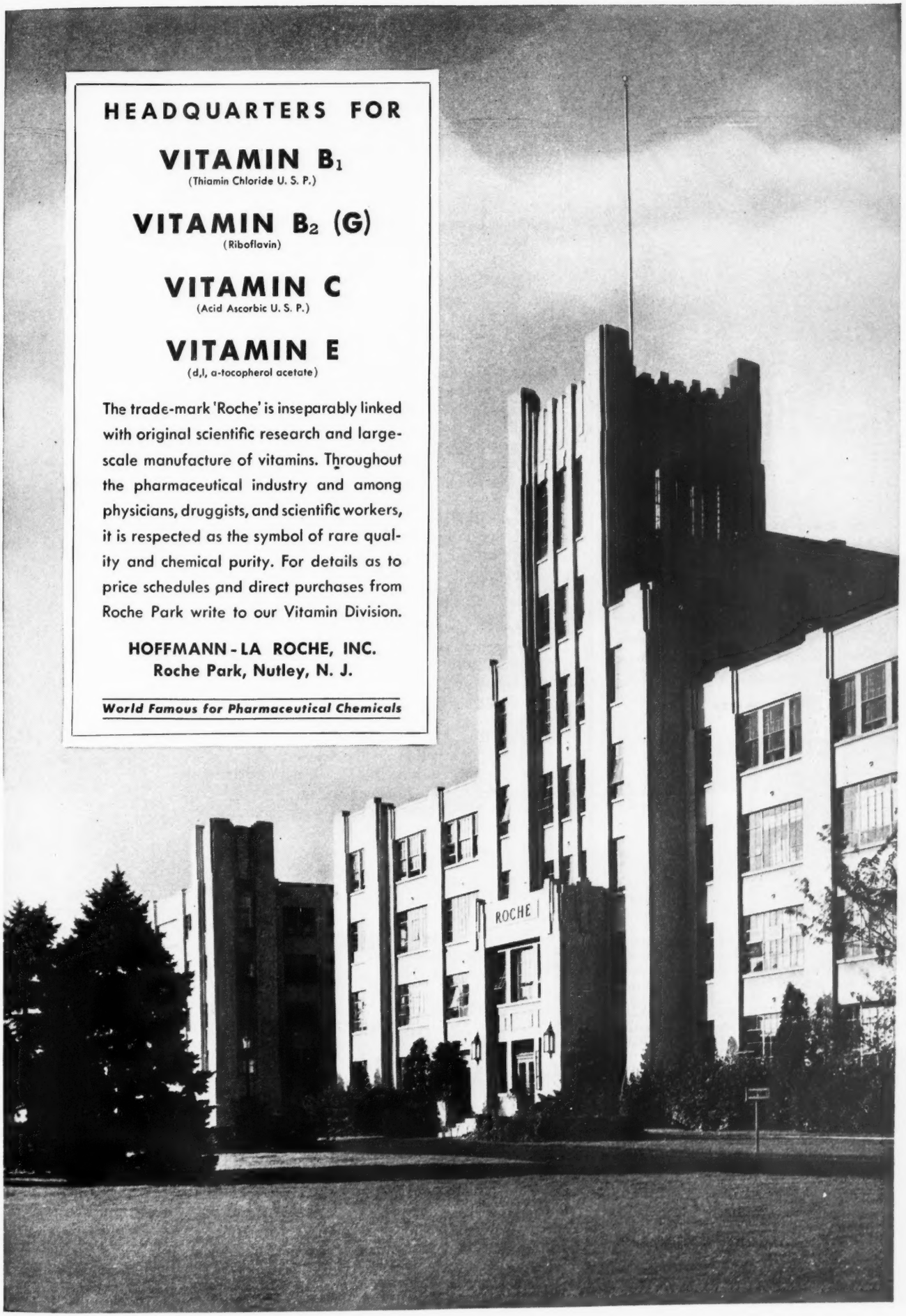
ELECTRIC HEATING—American Instrument Co., Silver Spring, Md., has published Bulletin 2075, entitled "Lo-Lag Electric Heaters and Controls", describing 3 types of heaters and various controls.

EQUIPMENT DIRECTORY—The 1940 directory of Allis-Chalmers Mfg. Co., Milwaukee, Wis., lists more than 350 separate bulletins and 1,610 different products in a 32-page guide and engineering aid on power, electrical and industrial machines.

FANS—New sizes and models of propeller-type fans and blowers are described in Catalog No. 12 of Hartzell Propeller Fan Co., Piqua, Ohio, complete with air delivery tables.

FREEZING COSTS—Examples of diesel engine installations where freezing costs have been lowered are cited in Form 5961, by Caterpillar Tractor Co., Peoria, Ill.

GAS ENGINES—Vertical, four-cycle, 25 in. stroke gas engines for application in power service are announced



HEADQUARTERS FOR

VITAMIN B_1
(Thiamin Chloride U. S. P.)

VITAMIN B_2 (G)
(Riboflavin)

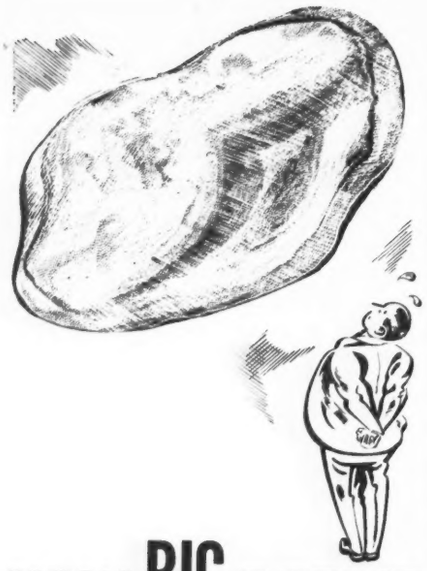
VITAMIN C
(Acid Ascorbic U. S. P.)

VITAMIN E
(d,l, a-tocopherol acetate)

The trade-mark 'Roche' is inseparably linked with original scientific research and large-scale manufacture of vitamins. Throughout the pharmaceutical industry and among physicians, druggists, and scientific workers, it is respected as the symbol of rare quality and chemical purity. For details as to price schedules and direct purchases from Roche Park write to our Vitamin Division.

HOFFMANN-LA ROCHE, INC.
Roche Park, Nutley, N. J.

World Famous for Pharmaceutical Chemicals



HOW BIG DOES IT LOOK TO YOU?

For some food processors, the Saratoga chip business is "small potatoes"—a side line. To others it's a year round backlog that looks pretty big when the net profit is totaled. The difference is due to production methods.

FERRY CONTINUOUS POTATO-CHIP MACHINES

have put this popular product in the big-business class. And the reasons are obvious: These fully automatic machines turn out a continuous stream of *uniformly* top-quality chips at a much lower cost than by other methods. There are no rancid, no soggy, no burnt chips to embarrass your trade or slow down your output. These machines can produce from 50 to 350 lbs. of perfect chips per hour. And changing over to the production of Juliennes is a matter of minutes! Interested? Write us today for complete details and list of satisfied users.

ALSO MAKERS OF:

SLICERS & AUTOMATIC SLICER FEEDERS

CAN WASHING MACHINERY

J. D. FERRY CO.

129 SO. CAMERON ST.

HARRISBURG, PA.

in 8-page Bulletin S-550-B7, by Worthington Pump and Machinery Corp., Harrison, N. J.

INSULATION — Corkboard, Fiberglas and Temlock are discussed as standard equipment for insulating trucks and trailers in transportation of perishable and quick-frozen foods, by Armstrong Cork Co., Building Materials Division, Lancaster, Pa., in "Insulation for Trucks and Trailers".

LUBRICANTS — "The Lubriplate Film", published by Fiske Bros. Refining Co., Newark, N. J., March, 1940, gives facts about Lubriplate lubricants for bottling machinery.

METERS—Catalog No. 2003 on mechanical flow meters, and "Increase Production Without Plant Expansion", on steam flow meters and CO_2 meters, have been issued by The Brown Instrument Co., Wayne and Roberts Aves., Philadelphia, Pa.

NOZZLES—Bulletins No. 600C to 612C of Spray Engineering Co., 114 Central St., Somerville, Mass., describe and illustrate various types of nozzles for industrial purposes.

PUMPS—A new line of two-stage, split-case pumps is announced in illustrated Publication APB290.1 by Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Ill.

RUBBER HOSE—"Hose Hints" giving general information on the selection of the proper hose for specific needs is the subject discussed in 32-page Form M9333, by U. S. Rubber Co., Rockefeller Plaza, 48th St. and Sixth Ave., New York, N. Y.

SEPARATORS—Publication 2950, Cochrane Corp., 17th St. and Allegheny Ave., Philadelphia, Pa., deals with baffle-type moisture and oil separators for use in vertical or horizontal steam, gas and air lines.

SHIPPING EQUIPMENT—Form AD 14, of Acme Steel Co., 2840 Archer Ave., Chicago, Ill., deals with Steelstrap tools and accessories for reinforcing all types of shipping packs.

VENTILATING EQUIPMENT—DeBothezat Bifurcators for removal of fumes, vapors and high temperature gases are covered in 12-page illustrated Bulletin No. 30-D-1, by DeBothezat Ventilating Equipment Division, American Machine and Metals, Inc., East Moline, Ill.

WATER SYSTEM—"R-C Auto-Flo" modern water system for small installations, is announced in Bulletin 260-B13D, by Turbine Pump Division, Roots Connersville Blower Corp., Connersville, Ind.

WATER TREATMENT — Technical Publication 178 of Wallace & Tiernan Co., Inc., Newark, N. J., introduces three types of hypochlorinators for chlorination of small water supplies.

Packaging

CASEIN—"Modified Caseins and Caseinates" containing 48-pages of information on new casein modifications, introduces "Protovac" casein products of Casein Co. of America, Division of Borden Co., 350 Madison Ave., New York, N. Y.

LABELERS—Two new World Labelers, Model S Improved flexible semi-automatic and Model CH semi-automatic, are introduced in two recent bulletins of Economic Machinery Co., Worcester, Mass.

Trucks, Tractors & Accessories

TRUCKS AND TRAILERS—Dry-Zero Corp., 222 N. Bank Drive, Chicago, Ill., lists four advantages of the all-steel "Lindsay Structure" truck body in a recent 4-page bulletin.

Control Equipment

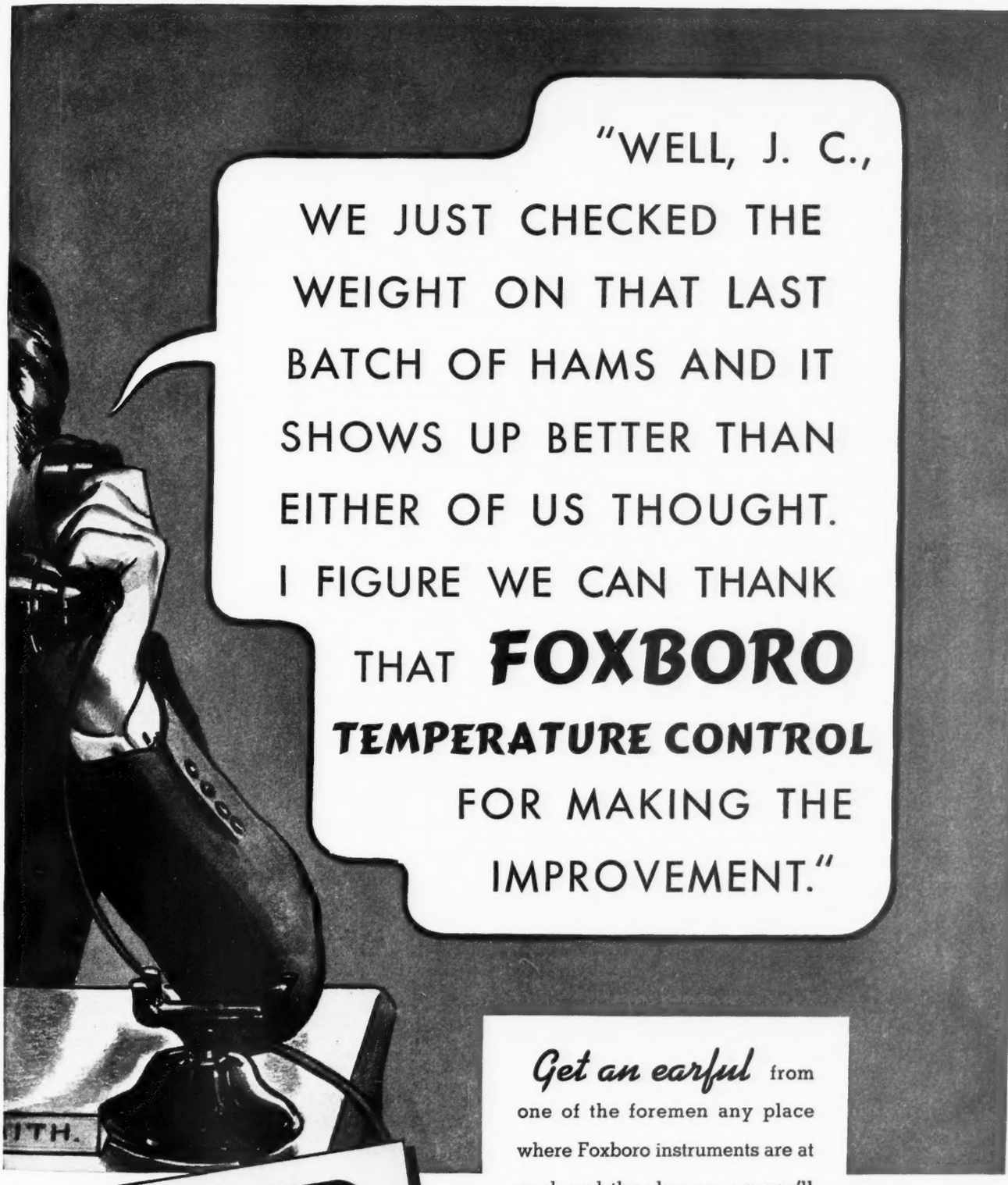
POTENTIOMETERS—Catalog E-50B (3), 1940, replacing Bulletin 755, of Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia, Pa., describes Type K potentiometers and accessories for precise measurements of potential difference and electromotive force.

PROCESS CONTROL EQUIPMENT — The Foxboro Co., Foxboro, Mass., has recently issued 8-page illustrated Bulletin 241, explaining time and sequence systems for automatic process operations, instruments employed and typical application.

Miscellaneous

HAND CLEANER — "Lan-O-Kleen" double-action hand cleaner is described in a 4-page folder by West Disinfecting Co., 42–16 West St., Long Island City, N. Y., as a powdered soap having corn meal as its base and impregnated with lanolin.

STAINLESS STEEL—Jessop Steel Co., 530 Green St., Washington, Pa., introduces "Silver-Ply" stainless-clad steel equipment in a recent 28-page illustrated booklet, giving information on its fabrication, advantages and typical installations.


"WELL, J. C.,
WE JUST CHECKED THE
WEIGHT ON THAT LAST
BATCH OF HAMS AND IT
SHOWS UP BETTER THAN
EITHER OF US THOUGHT.
I FIGURE WE CAN THANK
THAT FOXBORO
TEMPERATURE CONTROL
FOR MAKING THE
IMPROVEMENT."
Get an earful from one of the foremen any place where Foxboro instruments are at work and the chances are you'll hear something that adds up to the same thing: Because Foxboro has the edge in practical performance, Foxboro gets the vote of the men in the plant.
FOXBORO
REG. U. S. PAT. OFF.
Instrumentation
Graduated ACCURACY RESPONSE
TEMPERATURE • LIQUID LEVEL
PRESSURE • FLOW • HUMIDITY
THE FOXBORO CO., 30 NEPONSET AVE., FOXBORO, MASS., U.S.A. • BRANCHES IN 25 PRINCIPAL CITIES

Food Equipment News

REVIEW OF FOOD PROCESSING EQUIPMENT, ACCESSORIES, AND SUPPLIES

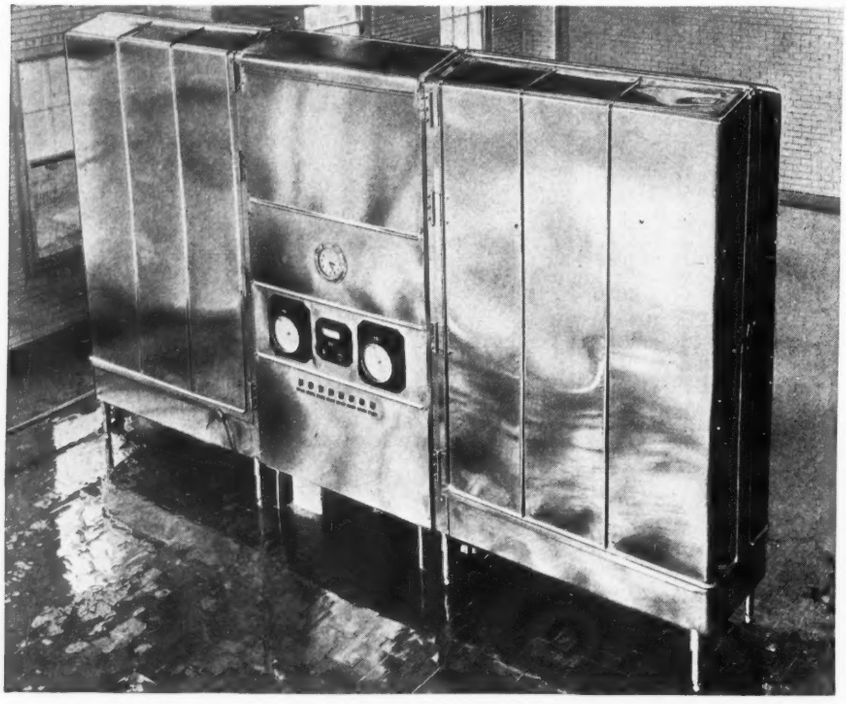
Clamp for Mixer

MIXING EQUIPMENT Co., Rochester, N. Y., has developed a new easy-adjustment clamp for use in attaching the "Lightnin" portable mixer. With this clamp, a turn of a hand wheel locks the mixer in position for any selected mixing action. This result is obtained through the use of a new patented double wedge which tightens the unit more firmly and rigidly and which is said not to work loose.

Short-Time Pasteurizer

MOJONNIER BROS. Co., 4601 W. Ohio St., Chicago, Ill., is making a new design of short-time, high-temperature pasteurizer. This consists of a heating unit in two sections; a "meandering" holder, so arranged that all milk is held at maximum pasteurizing temperature for not less than 16 seconds; a Mojonnier flow diversion valve; a closed cooler distributing trough; a standard Mojonnier "Compact" cooler; and necessary controls. Construction is of stainless steel.

Advantages claimed for this pasteurizer, resulting from its design and control, are: (*a*) low bacteria count and the destruction of all pathogenic bacteria, (*b*) improved flavor of milk, (*c*) increased keeping quality, (*d*) unaltered viscosity, (*e*) satisfactory cream volume, (*f*) no gaskets, (*g*) no baking-on of solids, (*h*) exact heating, (*i*) great flexibility, (*j*) no change in chemical or physical properties of milk and normal separation in power separators, (*k*) no pressure but only gravity flow, (*l*) easy handling of milk, (*m*) no short circuiting, (*n*) self-emptying, (*o*) economical operation, and (*p*) ease of cleaning.

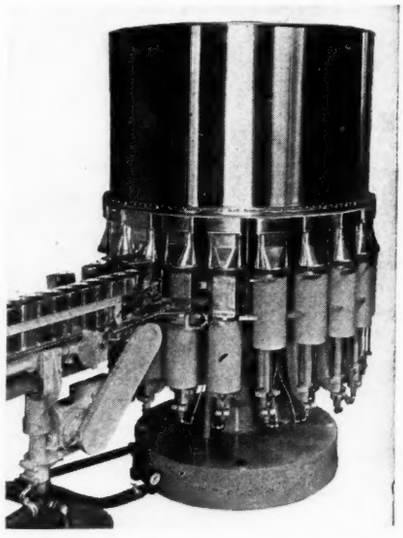


Mojonnier short-time, high temperature pasteurizer for milk.

Vacuum Filler for Powders

IN THE JUNE, 1939, number of *Food Industries*, p. 353, a description was given of a vacuum filling machine for powders, made by Modern Packaging Machinery Co., Danville, Ill. Since that time this machine has been entirely redesigned and developed into a high speed, continuous rotary vacuum filler, as shown in the accompanying illustration.

Instead of one filling head, the new machine has up to 20 heads and will operate at speeds up to 240 cans per minute. The containers may be fed on to the belt by hand or automatically. When the container is delivered to its position on the filling dial, it is automatically raised into a shroud and a vacuum drawn around the outside of the container as well as the inside, in order not to distort the container and to take care of any leaks which might occur in the seams.



High speed machine for vacuum filling of powders.

In filling, air is evacuated from the container through a very fine mesh screen, thereby pulling the product into the container through an opening in the head, while the screen keeps the products from passing out of the container into the vacuum pump.

When a container is filled, it is delivered onto a discharge belt, which in turn delivers it to the capper or sealing machine.

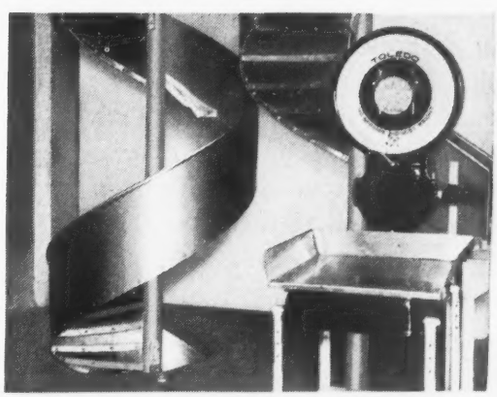
This machine requires a 3 hp. motor for operation and occupies a floor space 44 in. wide and 10 ft. long. The height of the machine is governed by the size of the containers being used, varying from 4½ to 5½ ft. Machines of smaller capacity than 240 cans per minute are available and require less floor space. The range available is 40 cans per minute to 240 per minute.

(*Turn to page 86*)

Chosen BY LEADERS IN MORE THAN 50 DIFFERENT INDUSTRIES

. . . Such Preference For STANDARD CONVEYORS *Must Be Merited*

For more than thirty years the Standard Conveyor Company has been helping American industrial leaders over the entire range of manufacturing and processing industries to lower the cost of product handling. Many outstanding advances in conveyor engineering have been pioneered by "Standard Conveyor."



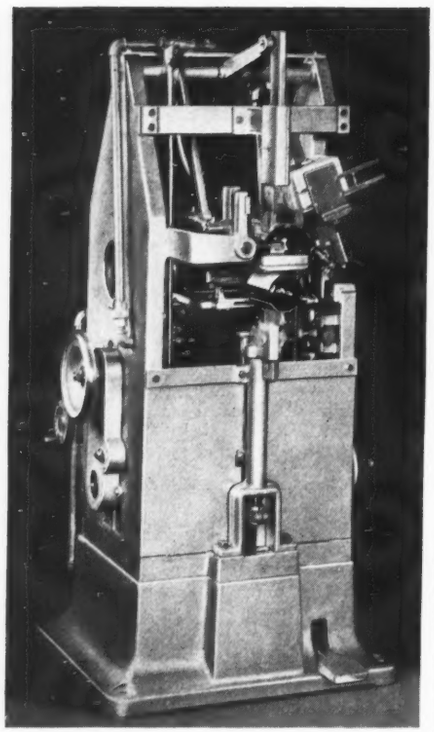
With so wide an experience record and special knowledge to draw upon, Standard Engineers are fully qualified to render valuable engineering counsel to production and plant executives, engineers, industrial architects and contractors, concerning conveying and conveyors.

Call a Standard Engineer on your next conveyor requirement and send for bulletin—"Conveyors by Standard"—a valuable reference book on conveying methods.

Standard "THE STANDARD OF VALUE"
CONVEYORS
STANDARD CONVEYOR COMPANY—NORTH ST. PAUL, MINN.

A valuable reference book on Conveyors — "Conveyors by Standard"—is available upon request to plant and production executives.

YOUR Idea of a LABELER



If you were to draw the specifications of an ideal labeler for your needs we believe you'd come very close to describing this new *Model CH* WORLD Semi-Automatic Labeler.

It has everything you look for in a labeler—simple, sturdy design, neat, precise, rapid labeling, quick, positive adjustment to any size and shape of label or container, extreme operating convenience and accessibility, low first cost, operating cost and maintenance cost.

Write for new Bulletin CH-8 containing complete information on this new and better WORLD Labeler.

ECONOMIC MACHINERY CO.

WORCESTER, MASSACHUSETTS

"Double" Steel

A NEW PROCESS for making steel, in which two steels are combined, has been developed by Allegheny-Ludlum Steel Corporation, Pittsburgh, Pa. The process produces a material called "Pluramelt" and provides a new combination of inexpensive strong carbon steel with a coating on outside of corrosion-resistant stainless steel. It is made by a process in which special steels are melted and joined to low-cost steels in the ingot form, so that plates or sheets rolled from these ingots have a thin coating on one or both sides of the special resistant steel, while the main body of the material is composed of low-cost steel. By this means, it is said that inexpensive, strong fabricating material is available for the construction of various types of processing equipment.

Balanced Pump

WORTHINGTON PUMP & MACHINERY CORP., Harrison, N. J., is making a new balanced Monobloc centrifugal pump. In this pump, the motor and pump have been engineered as a unit of balanced functional design. As a result, it is claimed that the unit requires a minimum of floor space and yet provides ample room for the repacking of the stuffing box. The shaft has been made of large diameter and is mounted on rigid bearings, in order to maintain correct alignment of all rotating parts, thereby increasing the life of the packing. The motor is of a new drip-proof design featuring a directed flow of ventilating air which prevents the drawing of moisture into the motor interior.

Pumps of this design are available in sizes from 1 to 4 in. with capacities up to 1,000 g.p.m. against heads up to 280 ft. Bronze fitted, all iron and all bronze construction are available. Mountings may be vertical or horizontal as suited to the installation.

At left is the tied flour bag, while at right is shown the flat, neat glue-sealed flour bag produced by the new filling machine.

Sealing Machine

GENERAL MILLS, INC., through Mr. Helmer Anderson of its manufacturing division, has perfected the Anderson sealer, a machine for glue-sealing of paper flour sacks, in sizes from 10 to 24½ lb. Previously, all paper sacks in this size range were bunched together at the top and tied with wire or cord. Sealed in this new way, the flour sacks make a neater appearance and also pack and stack in less space. Also, the seal is tighter than the old tie, thus giving the packaged flour protection from sifting, contamination or insect infestation. In addition, the package is designed for easy handling, as the top fold provides a convenient hand-hold.

The machine that makes this seal is automatic and operates at high speed. It can be placed directly in the bag-filling line.

New automatic flour bag sealing machine in operation.

Lock Nuts

ELASTIC STOP NUT CORPORATION, Elizabeth, N. J., has brought out nine new types of nuts, all embodying this company's self locking element, which is a resilient non-metallic collar built into the head of the nut. The new types include the thin hexagonal, spline, internal wrenching, countersunk and counterbored one-lug anchor, countersunk and counterbored two-lug anchor, countersunk corner anchor, bracket anchor, floating right-angle anchor, and floating basket anchor.

Label Protection

THE VARNITON CO., P.O. Box 1541, Station E, Los Angeles, Calif., is making "Varniton," a label varnish for the protection of labels against grease, oil, water and chemicals. This label varnish is especially recommended by the maker as a primer for labels on tin cans. In use, the tin surface is first coated with the varnish, which is allowed to dry. Then a wet, gummed label is placed over the varnished area. This is said to protect against loss by warping of the paper or from other causes.

Label varnish for protection against grease, oil, water and chemicals.

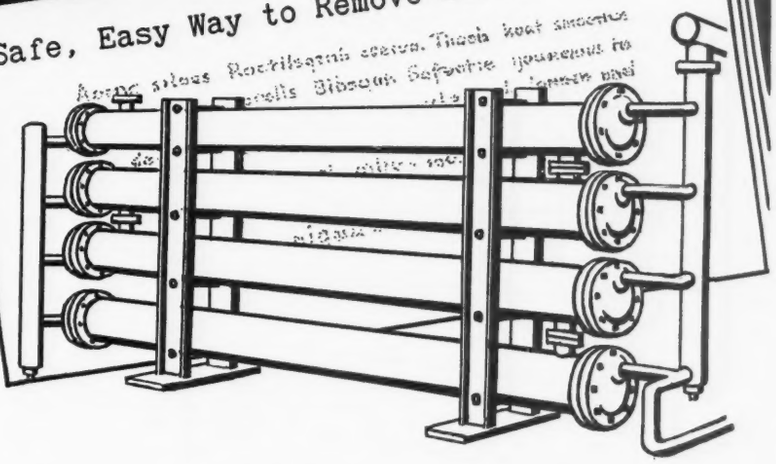
Ice Cream Slide Rule

AS AN AID to making calculations used in ice cream making, B. I. Masurovsky, 1820 Morris Ave., New York, N. Y., is marketing a slide rule which provides a rapid and simple calculating means for the manufacturer. The upper scales, *A* and *B*, on this rule are for calculations based on propor-

No. 5

RECIPE FOR FOOD PLANT SANITATION

Safe, Easy Way to Remove Scale and Rust



Proper, uniform cooling and refrigeration essential to protection of many food products

WHEREVER food products of any type require cooling and refrigeration either as part of a production operation or as a protective measure to safeguard product against spoilage or bacterial contamination, much depends on the maintenance of ammonia condensers and similar equipment to see that they function efficiently and provide the constant, proper cooling or refrigeration necessary.

Safe, low-cost Oakite method quickly removes hard water scale from ammonia condensers

When hard water scale and rust accumulate on the water cooling surfaces of ammonia condensers, heat transfer is reduced and thus the refrigerating capacity of the system is lowered. But you can easily remove insulating deposits that prevent proper heat transfer by circulating a solution made up with Oakite Compound No. 32 . . . then rinse and neutralize. Other water cooled equipment such as water jackets of dough mixers, candy cooling tables, bread coolers, mixing kettles, may be treated in the same way to quickly, safely restore operating efficiency.

FREE BOOKLET GIVES DETAILS

Write today for YOUR copy of FREE booklet, giving directions, formulas and other interesting data for economically handling this important maintenance work. No obligation whatsoever.

OAKITE Certified CLEANING

Complete Nation-Wide Service For These Industries

•

CANNING
CEREAL PRODUCTS
MEAT PACKING
SEA FOOD
BOTTLING
ICE CREAM
BAKING
DAIRY
BREWING

Manufactured only by

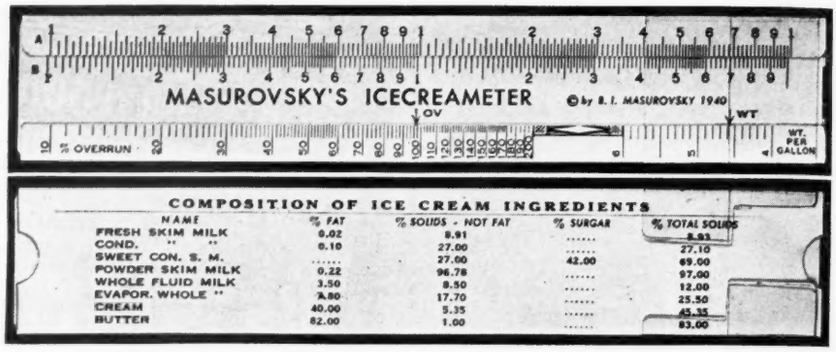
OAKITE PRODUCTS, INC., 26G THAMES ST., NEW YORK, N. Y.

Representatives in All Principal Cities of the United States and Canada

tion. The arrow-marked *OV* points to per cent overrun on the lower left-hand scale. The arrow marked *WT* points to weight per gallon of ice cream on the lower right-hand scale.

On the reverse side of the slide rule is printed a table of composition of ice cream ingredients in per cent of fat, solids not fat, sugar, and total solids.

This rule is protected by copyright by the maker.



COMPOSITION OF ICE CREAM INGREDIENTS

NAME	% FAT	% SOLIDS - NOT FAT	% SUGAR	% TOTAL SOLIDS
FRESH SKIM MILK	0.02	8.91	.....	8.93
COND. " "	0.10	27.00	.....	27.10
SWEET CON. S. M.	.....	27.00	42.00	69.00
POWDER SKIM MILK	0.22	96.78	.....	97.00
WHOLE FLUID MILK	3.50	8.50	.....	12.00
EVAPOR. WHOLE "	7.80	17.70	.....	25.50
CREAM	40.00	5.35	.....	45.35
BUTTER	82.00	1.00	.....	83.00

Front and back of Masurovsky's slide rule for ice cream makers.

Automatic Lubricator

SIMPLEX MFG. Co., 1504 Broadway, Detroit, Mich., is making an automatic lubricator, for which is claimed continuous feeding of lubricants to a bearing, regardless of viscosity or temperature changes. This lubricator is intended for use in the replacement of grease fittings or oil cups on existing machinery as well as for use for new equipment. One size, $\frac{1}{4}$ oz. capacity, is now available, but larger sizes including types suitable for large installations are being developed.

The lubricator is essentially a spherical steel shell with a grease fitting and a $\frac{1}{8}$ in. pipe thread connection for insertion in the bearing hole or into an adapter. Inside the shell is a hollow ball made of Neoprene (grease resistant synthetic rubber). The outlet channel is so built that the ball cannot clog it.

When grease or oil is forced into this fitting, pressure collapses the ball and compresses the air inside of it. The energy stored in this manner feeds lubricant to the bearing.

Printing Tape Dispenser

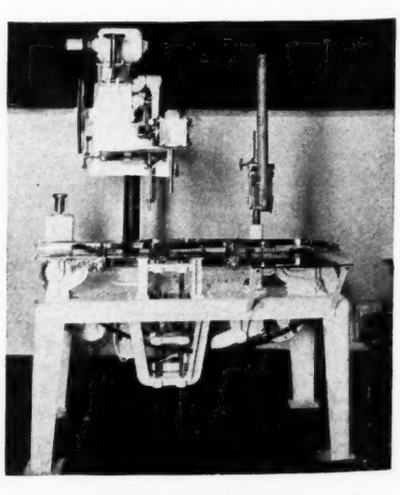
PRINTAPE COMPANY, Chrysler Bldg., New York, N. Y., has introduced the "Printape" machine for printing transparent tape continuously as the tape is dispensed for use. This device will print text up to 3 in. long continuously on the adhesive side of transparent tape used in packaging. It is said to be readily adjustable and was developed to simplify adherence to Federal, State and local regulations controlling labeling.

Filler for Food Containers

THE PFAUDLER CO., Rochester, N. Y., has recently brought out new models of its "Pfaudler-King" piston type filler for use with semi-liquid food products in the filling of glass, tin or fiber containers.

This filler is supplied in either the automatic hand feed type or the automatic chain feed type. It comes in three sizes as follows: model 300-G, capacity 2 to 10 oz., speeds 20 to 40 containers per minute; model 350-G, 2 to 37 oz., 20 to 40 containers per minute; model 400-G, 6 to 65 oz., 15 to 40 containers per minute. These machines are constructed with all contact parts made from nickel alloy and with a reservoir of polished stainless steel. Reservoir can be equipped with an agitator if necessary.

Advantages claimed for this filler are a positive cut-off valve eliminating drip and waste, quick adjustability to within a fraction of an ounce, easy cleaning, no change of parts



Piston filler for semi-liquid products.

GET ALL THREE *in Metso Cleaners*

1 WASHING and scrubbing in less time is #1 reason why Metso Cleaners click in busy food plants. Metso dissolves quickly in water, and on first contact starts working on grease and dirt. Metso leaves a water film on the cleaned surface and not a grease film.

2 Point #2: Metso is more restrained in its action on sensitive metals such as aluminum. Metso puts pep into your cleaning but its silica content is scientifically balanced with alkali so that corrosive effect is greatly controlled.

3 Point #3: Metso saves money, because it's low in cost, priced as basic alkalis. Ask for information and quotations on METSO for your plant.

Metso Cleaners (Sodium Metasilicate & Sodium Sesquisilicate) originated and developed by

ESTABLISHED 1831

PHILADELPHIA QUARTZ COMPANY

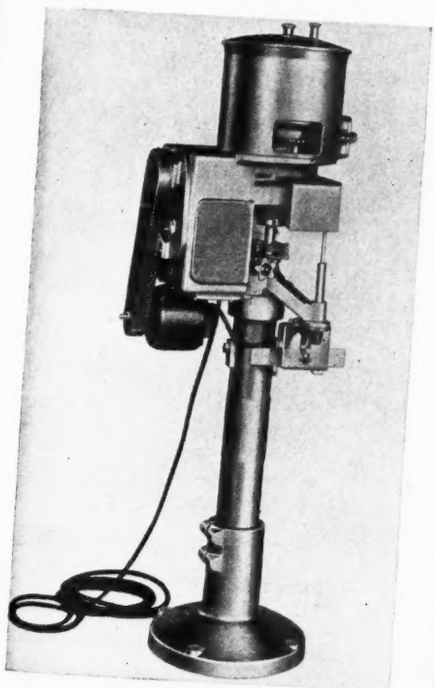
General Offices: 125 S. Third St., Philadelphia. Chicago Sales Office: 205 W. Wacker Dr. Stocks in 60 cities. Sold in Canada by National Silicates Ltd., Toronto.

METSO CLEANERS

necessary when changing from one size container to another, variable speed drive on motor driven type to provide control of filling speeds, adjustable valve for filling light or heavy products, and design to prevent entrapping of air.

Salt Tablet Dispenser

INTERNATIONAL SALT CO., INC., Scranton, Pa., has brought out a positive action salt tablet dispenser for use by canners and other food packagers, under the trade name "Saltomat." This dispenser, in standard models, operates at speeds of 120 to 150 tablets per minute. Requirements for higher speeds or for special machines can be met. Advantages claimed for the new dispenser are a "rifle barrel feed" which is said to be positive and accurate, selecting only one tablet at a time from the storage hopper; a new insert-



Salt tablet dispenser for canners and food packers.

ing action for placing the tablet in the container, making use of a set of "rubber fingers"; and a new controlling device employing a positive action solenoid switch, said to synchronize accurately the operation of the machine so that operation occurs only when a container is in position to receive the tablet.

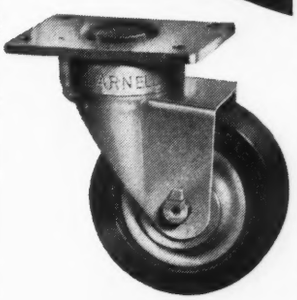
Packless Expansion Joint

AMERICAN DISTRICT STEAM CO., No. Tonawanda, N. Y., has brought out the "Adsco Packless Expansion Joint," a U-ring type expansion joint

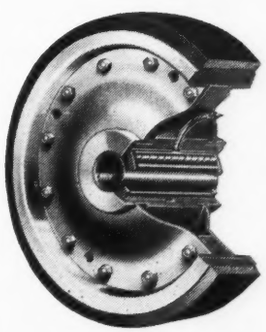
No Bogging Down in mid-afternoon with Darnell DOUBLE BALL-BEARING Casters and E-Z ROLL WHEELS

MOVE MATERIAL *the Easy Way--*

Maintain maximum employee efficiency – equip your hand trucks and other movable equipment with DARNELL Casters and Wheels–SAVE MONEY and eliminate that mid-afternoon "bogging down" of production.



Durable, precision-built Darnell Casters and Wheels assure the easy handling of heavy loads – savings in floor and equipment wear soon pay for their cost.



All Darnell Casters feature a Double Ball-Bearing Swivel –all wearing parts are carbonized and hardened.

It will pay you to learn why Industry prefers Darnell Casters & Wheels . . . Write for new 192-page Caster & Wheel Manual.

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DARNELL CORP. OF CANADA, LTD., TORONTO, ONT., CAN.

for high and low pressure and temperature service on steam and hot water lines. In this joint, the expansion element is made up of a series of welded U-rings of corrosion resistant metal. This series of rings is welded to the joint body and to the guide on the movable sleeve, to form a permanent seal. The expansion element is compressed axially, or cold-sprung one-half of the total traverse for installation in the cold line. As the line expands, upon heating, the compression in the element is relieved, so that it passes through the neutral position and into tension for the remaining half of the traverse.

High-speed Bread Wrapper

AMERICAN MACHINE & FOUNDRY Co., 511 Fifth Ave., New York, N. Y., has brought out the AMF "60" wrapping machine for bread. This is a high speed design wrapping up to 60 loaves per minute. The manufacturer claims that not only has the speed been increased but the design has been improved to produce a better package particularly as to tight ends and smooth bottoms. This wrapping machine has been designed to hook up with any type of high speed bread slicer.

Device for controlling time of telephone and teletype calls.

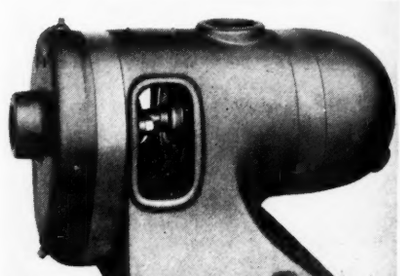
Telephone Time Meter

A DEVICE for insuring against expensive overtime of long distance telephone and teletype calls, the "Tele-Trol", has been developed by Holcomb & Swenarton, 92 Liberty St., New York City.

As can be seen in the accompanying illustration, this device is equipped with a lever on one side. When the call starts, the lever is pressed. The instrument keeps tracks of the time and warns by ringing a bell automatically, 15 seconds before time is up.

Pumping Unit

SMITH METER Co., 5743 E. Leneve St., Los Angeles, Calif., has developed the "Smithway" centrifugal pump unit consisting of a pump and motor mounted together in a single frame. This unit is fully inclosed and is said to provide the smallest size-to-power and the highest power-to-weight ratio of any similar unit operating on standard cycle three-phase current.

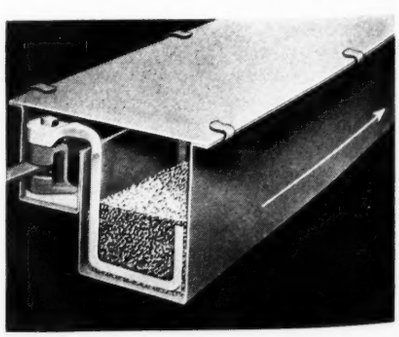


Fully inclosed centrifugal pumping unit.

These units come in sizes from to 10 hp. and handle from 20 to 200 gal. per minute at heads up to 250 ft. Operation is claimed at temperatures of 200 deg. F or over. Because fully inclosed, this unit is said to be protected from outside influences such as dust and moisture and to be able to operate at predetermined temperatures under all conditions.

Horizontal Closed-Circuit Conveyor

CLEANLINESS and freedom from contamination are the important features of a new design of the Redler conveyor developed by Stephens-Adamson Mfg. Co., Aurora, Ill. This design is available in the horizontal, closed-



Cross-section of new horizontal closed circuit conveyor.

42 Years Experience— SO WHAT?

We Design & Build Machines for—

CUTTING
CRUSHING
GRINDING
MIXING
SIFTING
MILLING
SORTING
PULVERIZING
FLOCKING
DEFIBERIZING
MASTICATING
CLEANING
ELEVATING
CONVEYING
Etc., Etc., Etc.

Even if it were 142 years it wouldn't mean anything unless *you* could capitalize on it—profit by it, as many important food processors are doing today.

Highly efficient machines for any of the operations listed at left have been developed here for processing an endless list of ingredients—machines that do the job quicker, better, cheaper.

If you want complete information on any of this money-making equipment simply check the operations involved, attach this ad to your letterhead, and we will forward you a fully illustrated catalog by return mail.

ROBINSON MANUFACTURING CO.
71 Painter St., MUNCY, PA.

circuit type of Redler and features a driving chain moving in a compartment separate and distinct from that in which the material is conveyed. As a result, metal-to-metal contact is avoided in the carrying run of the conveyor, thus preventing contamination of the material with dirt or lubricant which might result from metal-to-metal contact of sprocket and chain or chain and casing.

These new horizontal conveyors are recommended for use where multiple discharge points on horizontal runs are required as in the filling of bins or silos, or the feeding of a battery of machines.

High Strength Paper for Filter Presses

ETHONE CO., 442 Elm St., New Haven, Conn., has announced a new high strength paper for use in filter presses. This paper is said to possess the highest wet strength of any paper on the market for this purpose. In use it is placed against the filtering canvas or screen so that the filter cake deposits on the paper. The result enables rapid cleaning of the screen by removing the paper carrying the cake. This paper is also said to retain its high strength in acid and alkaline solutions.

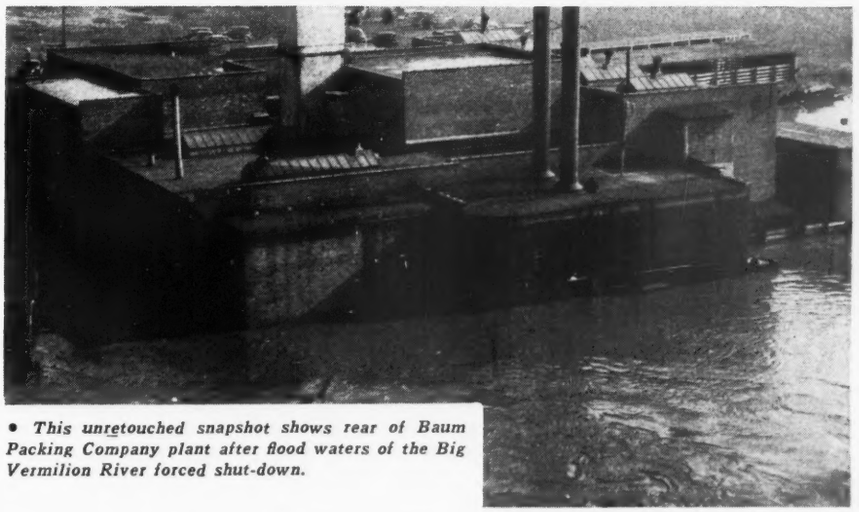
Air Conditioning Refrigerators

CARBONDALE DIV., WORTHINGTON PUMP & MACHINERY CORP., Harrison, N. J. has developed new refrigeration units designed primarily for use in air conditioning work. These are of the 8-cylinder V-type for use with Freon-12 and are available in capacities from 75 to 125 tons for a single unit and up to 250 tons with duplex arrangement. The units are built for either V-belt or direct motor drive. They can be supplied with either a horizontal shell and tube type condenser, mounted on the unit, or without condenser for use with a Worthington-Carbondale Shower condenser.

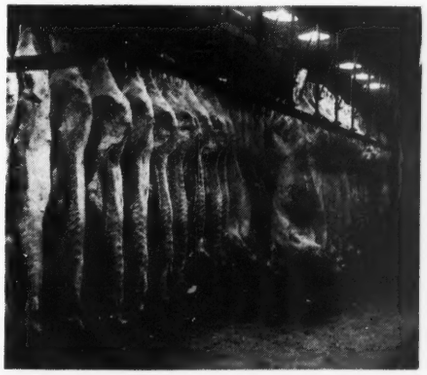
Rotary Pump

BLACKMER PUMP CO., Grand Rapids, Mich., is manufacturing the Type DC rotary pump with a maximum capacity of 20 g.p.m. when direct connected to an 1,800 r.p.m. motor. This pump which is designed for handling any clean liquid will develop pressures up to 100 lb. It is available with three different sizes of base in order to accommodate motors ranging from $\frac{1}{4}$ to 3 hp. Both inlet and discharge connections are of the screw type, $1\frac{1}{4}$ in. in diameter. The pump is self-priming. It is available in all-iron, bronze-fitted, or all-bronze construction.

FLOOD CAUSED COMPLETE SHUTDOWN—BUT . . .



• *This unretouched snapshot shows rear of Baum Packing Company plant after flood waters of the Big Vermilion River forced shut-down.*



• *Perishable meats like the above, stored in the Baum plant, were saved from spoilage by the efficiency of Mundet Cork Insulation, after refrigeration power was shut off.*

. . . Sharp Freezer Room Lost Only 5 Degrees in 108 Hours . . . Mundet Insulation Prevented Spoilage During Crisis.

From an unsolicited letter sent by the Baum Packing Co., Danville, Illinois, to the Mundet office in Chicago:

"During a recent flood our plant was almost completely under water, making it necessary to shut down all refrigeration.

"Our sharp freezer, maintained at a constant temperature of 15° below zero, was completely shut down for 108 hours and we had a 5 degree loss during that time. We were agreeably surprised at this small loss, because of the perishable quality of the foods stored in this freezer."

The insulation that passed this unusual test was Mundet Corkboard. Day in and day out, proof of the outstanding merit of Mundet Cork Insulation is being given in refrigeration plants of all sizes. Tests under normal service conditions may be less dramatic than the one above, but they are conclusive in the operating economies they reveal. Mundet offers responsible engineering and installation services, covering all phases of low temperature insulation. Recommendations and estimates are supplied promptly. Mundet Cork Corporation, Insulation Division, 65 S. Eleventh Street, Brooklyn, N. Y. Mundet District Offices are located in principal cities.

MUNDET CORK INSULATION

Food Technology

NEW DISCOVERIES & INVENTIONS

FOOD TECHNOLOGY

Chemical "Cooking" of Potatoes

TREATMENT of potato tissue with certain chemicals, such as chloral hydrate, formaldehyde, sodium saclicylate, or thiocyanate and subsequently with ammonium oxalate produces changes in the physical structure of potatoes similar to those occurring during cooking by heat. The chemicals effect cold gelatinization of the starch, and the oxalate weakens the intercellular adhesion by removing the calcium from the calcium pectate of the middle lamella, so that the treated tissue's outward appearance resembles closely that of cooked potatoes. The flavor, however, is still that of raw potatoes.

If the calcium is replaced in the cementing material (which holds the individual cells together) by adding calcium chloride, the chemically cooked tissue again reverts to a firm physical state that resists mashing to the same extent as underdone potato.

Although the texture of the potato tissue appears to be the same whether cooking is simulated by chemical means or is accomplished by heat, neither starch gelatinization or cell separation offer a satisfactory explanation for the differences between mealy and soggy potatoes, indicating that some other factor is involved.

Digest from "Simulation by Chemical Agents of Cooking of Potato Tissue," by C. J. Personius and P. F. Sharp, *Food Research* **4**, 469, 1939.

Resazurin Indicates Bacterial Content in Food

A WIDER USE of chemical redox potential indicators as indices for the bacterial content in fresh and frozen foods appears to be practicable. Similar to the application of methylene blue in milk control, resazurin permits the rapid singling out of foods with extraordinarily high bacterial counts with reasonable accuracy by food officials. This method should also prove useful in quality control, for instance, in progress check-up of successive stages of packaging.

Resazurin undergoes a two-stage reduction involving progressive color changes from blue, the original color of resazurin, to pink of resofurin to the colorless hydro-resofurin. Both the pink reduction time and complete reduction time vary somewhat in different products with approximately the same bacterial content. Different types of bacteria influence the rate of reduction, especially staphylococci in milk. The shorter the time required for the color change, the higher the range of bacterial counts.

Although numerous foods with low bacterial counts require more than six hours for reduction, this time is much shorter than that necessary for bacterial plate counts. Extremely high bacterial contents may be detected in some foods in less than half an hour, especially if the intermediate stage of resazurin reduction is used as an index.

Resazurin reduction times and bacterial counts agree favorably in a number of foods, including hamburg steak, shelled eggs, various fish and seafood, meats, gelatine, and certain vegetables.

Digest from "Redox Potential Indicators in Quality Control of Foods" by B. E. Proctor and D. G. Greenlie, *Food Research*, **4**, 441, 1939.

Staining of Lemons Due to Oxidation

STORAGE TEMPERATURES of 40 deg. F. and below are conducive to the development of membranous stain and pitting in lemons. Higher temperatures are undesirable because they stimulate the growth of fungus parasites.

Pitting is much more pronounced at 32 and 36 deg. than at 40 deg. F., and stains occur on 75 to 100 per cent of the fruits at 40 deg. F. But neither the variations in the percentage of sugar, acids and glycosides in the peel nor the variations in the sugar and acetaldehyde in the flesh before, during and after storage account for these defects.

Only a consistently low reductase activity between 30 and 40 deg. F. points to increased activity of the oxidases at these temperatures. The fact that the pits develop into dark stains and that pre-storage treatment with carbon dioxide or waxing prevents the spoilage of the fruit confirms the enzymatic character of this oxidative reaction.

Digest from "Physiological Studies of Lemons in Storage," by E. V. Miller, and H. A. Schomer, *Journal of Agricultural Research* **59**, 601, 1939.

FOOD ENGINEERING

Preserving Vegetables and Fruits

A NOVEL METHOD for preserving vegetables and fruits in frozen heat-insulating material is disclosed in Canadian Patent 386,909 (granted Feb. 13, 1940, to Joseph McCandless, Winnipeg, Man.). The vegetables or fruits are first embedded in wet sawdust in a container. This container is surrounded by a layer of dry sawdust in a somewhat larger container, which in turn is surrounded with wet sawdust in a still larger container. Thus, in effect, the material to be preserved is surrounded successively by a wet, a dry and a wet layer of heat-insulating material. The final steps are to freeze the outer layer of wet sawdust, and to place the entire assembly in a location not subject to large or rapid temperature fluctuations. The simplest expedient is to sink the containers into the ground.

BAKERY PRODUCTS

Bread Aroma

BREADS made with the aid of artificial dough-souring agents contain considerably more diacetyl and acetoin than breads from natural sour dough. The highest content of diacetyl and acetoin in ordinary sour-dough bread was 1.36 milligram-per cent, and some samples contained none at all. Artificially soured dough gave bread containing 2.01 to 3.22, while wheat bread made with yeast contained 8.12 milligram-per cent of diacetyl and acetoin. Since ordinary sour dough contained only 0.41 to 0.82, and yeast dough only 2 milligram-per cent, it is evident that diacetyl and acetoin are formed during dough fermentation, especially in yeast doughs.

Since breads with very low content of diacetyl and acetoin possess very strongly the characteristic bread aroma and flavor, it is evident that these substances are not the direct sources of the aroma. Nevertheless, the quantitative determination of diacetyl and acetoin yields important information in bread research, particularly in distinguishing between naturally and artificially soured doughs or yeast doughs. Meanwhile, a search for the true source of bread aroma is in progress.

Digest from "Studies of Bread Aroma," by E. Komm and G. Lehman, *Zeitschrift für Untersuchung der Nahrungsmittel* **78**, 458. 1939 (Published in Germany).

BEVERAGES

Clarifying Wines

ACCORDING to German Patent 679,646 (granted Aug. 10, 1939, to Bernhard Wullhorst, Joseph Burkard and Kurt Hennig and assigned to I. G. Farbenindustrie Aktiengesellschaft, Frankfort-on-Main) cloudy wines can be successfully clarified by sedimentation in the presence of amorphous iron oxides. The oxide particles, by entraining the particles causing turbidity, accelerate separation of the impurities from the clear wine.

The preferred method of preparing an amorphous iron oxide of the type which is effective for this purpose is to heat a hydrated oxide (hydroxide) of iron in a current of dry air. A suitable temperature for this operation is 660 deg. F.

Preserving Grapes and Grape Juice

CONSTANT storage temperatures and a uniform humidity are essential for the proper preservation of fresh grapes as well as for unfermented grape juice. Fresh grapes can easily be preserved from autumn to March, the juice increasing in sweetness according to the following treatment: After removing all defective berries, the carefully picked grapes are packed with paper separators into individual baskets holding from 15 to 18 lb. and placed for a few minutes in an autoclave (under slight vacuum) into which an unnamed antiseptic is sprayed. When stored at 32 deg. F. and at high humidity, no shrinkage or mold formation is observed. Humidity is regulated by changing the mean brine temperature of the air cooler.

When storing unfermented grape juice under moderate CO_2 pressure, the pressure should be 100 to 115 lb. per sq.in. The CO_2, however, must be replenished for two to four months,

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until pressure reduction ceases, and the pressure remains constant. It is also possible to impregnate fruit juices directly with CO_2 from below, particularly in small tanks. The storage tanks must be carefully designed and constructed and lined with a suitable medium to protect the natural taste and color, such as certain resins or stainless steel. The juice must be kept in refrigerated cellars under CO_2 at low pressure.

Digested from "Preserving Grapes and Grape Juice" *Bot. Ling.* 59, 40, 1935 (Published in England).

CANNING & PRESERVING

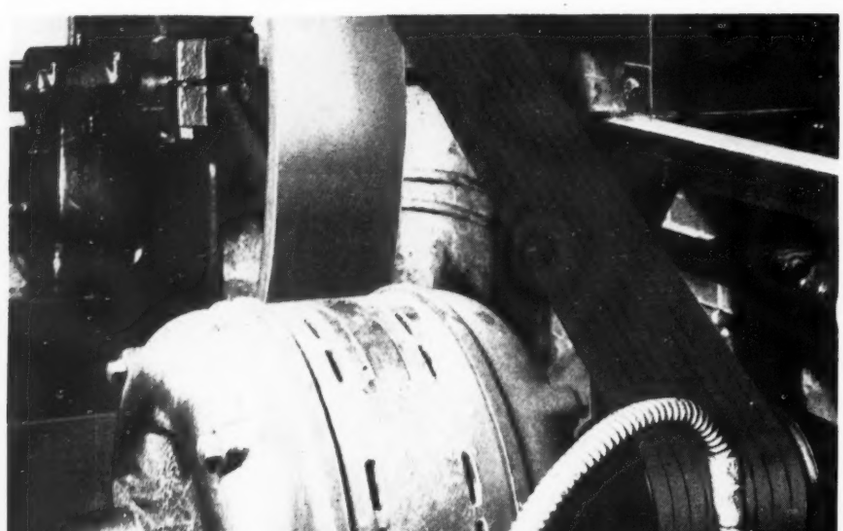
Russia Would Make Apple Jelly

SKIN AND CORES, comprising about 5 per cent of the raw fruit, were collected as waste products from the manufacture of apple butter and used to make experimental batches of apple jelly. The waste is fairly rich in pectin and was expected to give good jelling quality to juice prepared from it.

Juice was obtained from the waste in 39 per cent yield. It contained about 10 per cent dry matter. Trial batches were made up from about 5 gal. of juice, in three lots: (1) with pure sugar sirup flavored with bergamot oil; (2) with sugar and the sirup from cherry preserves; (3) with straight cherry preserve sirup. The final recipe was: apple juice (viscosity 8), 56 parts; cherry sirup (65 per cent sugar), 44 parts.

Jelling behavior was good. The yield of jelly was 26.5 per cent of the weight of the apple waste. Any cannery making apple products can make jelly from the waste, at the rate of about 13 tons of jelly per thousand tons of apples. The waste may be preserved till the end of the season by treatment with sulphite. In that case the sulphite is destroyed when the jelly is boiled.

Digest from "Utilizing Wastes from Apple Butter Manufacture," by S. M. Yastreboy, *Konservnaya i Plodoovoschchnaya Promyshlennost* 10, 4, 15, 1939 (Published in Russia).



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The *standard* HOWELL 15 HP, 1200 RPM Motor shown above has just rounded out 13 years of continuous service. It is installed at the Suabedissen-Wittner Dairy, South Bend, Indiana, driving a 15-ton ice machine under severe load conditions.

Not once in 13 years has this motor been out of commission — never required a single repair. Recently we checked it thoroughly—STILL O.K.

Yes, Sir, HOWELL Motors can take plenty of punishment year after year — even in the toughest "spots." That's undoubtedly the main reason why they are used so extensively throughout your industry on all types of drives.

Sizes range from ½ to 150 HP, either standard or splash-proof. It will pay you to send us your next motor inquiry.

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HOWELL ELECTRIC MOTORS COMPANY
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DAIRY PRODUCTS

Milk That Can Be Whipped

A PRODUCT made by a new method from milk protein can be whipped to a froth and is useful in baking. The method of preparing this product is disclosed in German Patent 679,829 (granted July 20, 1939, to Dr. Heinrich Knapp in Bad Blankenburg, Thuringia, Germany). The initial material is powdered milk, which is washed with a dilute solution of a volatile acid (preferably lactic or formic acid), carefully dried under mild conditions and treated with aqueous ammonia. Only a little ammonia may be used, so that the powder does not enter into solution. After repeating the cautious drying, the product is mixed with just enough of a solid organic acid to give it the proper pH value, which must not be below 5.

Measuring Ice Cream Quality

HOW FAR laboratory quality tests on ice cream check with the consumer's tongue was studied on 318 samples of Kansas ice cream. Bacteria counts, presence of coliform organisms, the phosphatase test for pasteurization, butter fat content, weight per gallon and score were determined.

About 60 per cent of all samples had below 100,000 bacteria per cubic centimeter, which is a fair standard of bacterial quality. Bacterial count did not have any definite relation to score. Presence of coliform organisms was common, pointing to more or less contamination after pasteurizing, since only seventeen phospha-

tase tests were positive. With ice cream it is essential to run control tests with the phosphatase test, otherwise samples will be wrongly reported as improperly pasteurized. The poorly pasteurized samples were generally of low quality. As the butter fat content increased, so generally did the quality determined by score. There was a general preference for ice cream weighing 4½ to 5½ lb. per gallon, an overrun of 66 to 102 per cent.

Ice cream quality will therefore include sanitary quality and taste quality, which two do not necessarily coincide.

Digest from "Measuring the Quality of Ice Cream," by W. H. Martin, F. E. Nelson and W. J. Caulfield, *Journal of Dairy Science* **23**, 135, 1940.

Ice Cream Texture

SMOOTHNESS or coarseness in ice cream texture will depend on the size of the ice crystals present. Increasing either fat or serum solids content improves smoothness and decreases ice crystal size. Serum solids are more effective than fat in bringing this about and in retarding freezing. However, when judged by taste, fat is more important, as its lubricating effect may mask the larger size of ice crystals present.

Digest from "Influence of Some Mix Components upon the Texture of Ice Cream," by W. C. Cole and J. H. Boulware, *Journal of Dairy Science* **23**, 149, 1940.

FLOUR & GRAIN

Vitamin E in Wheat Germ Oil

VITAMIN E, the anti-sterility factor in a balanced diet, is present in most vegetables, fatty oils, milk, eggs and meats, but it is most abundant in cereal germ oils. Among these, wheat germ oil ranks first as the richest known natural source.

Chemically, vitamin E is a lipoid having a structural and chemical similarity to fats and fatty oils, and as such it is unusually stable. It withstands autoclaving at 335 deg. F., or vacuum heating at 480 deg. F. Though oxidizable, it is not highly sensitive to oxidation and withstands ordinary exposure to air. It is, however, subject to gradual oxidation if exposed to air in very fine droplets. It should be protected from ultra-violet light, which accelerates the oxidation reaction in air. The vitamin is also fairly stable to acids and alkalies, being unaffected by acids unless exposure conditions are severe and by alkalies unless heat is applied. Thus, in presence of alkali the vitamin should not be heated above 105 deg. F.

Because of its vitamin E potency, wheat germ oil is beneficial for dis-

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The services of the Industrial Fumigation Engineers are nation-wide—one of these specialists is located near you. We will be glad to ask him to make a survey of your requirements and submit his findings for your study and consideration. This involves no expenditure of money on your part. Write to us today for full information.

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LIQUID HCN continues to be the fumigant of choice with the Industrial Fumigation Engineer. Its remarkable killing power, cleanliness in use, and low cost enables him to get the results that the flour miller and the food manufacturer want—complete insect control at low cost. Let us explain the advantages to you of LIQUID HCN fumigation, and write to us for the name of the Industrial Fumigation Engineer located nearest to you. He will be glad to make a survey of your plant at no cost to you.

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turbances arising from complete or partial sterility. Among these are repeated abortion, premature birth and the various aspects of sex debility. Prematurely born infants are also benefited by wheat germ oil.

Digest from "Vitamin E," by F. Gstirner, *Chemiker-Zeitung* 64, 45, 1940 (Published in Germany).

Ripening of Wheat

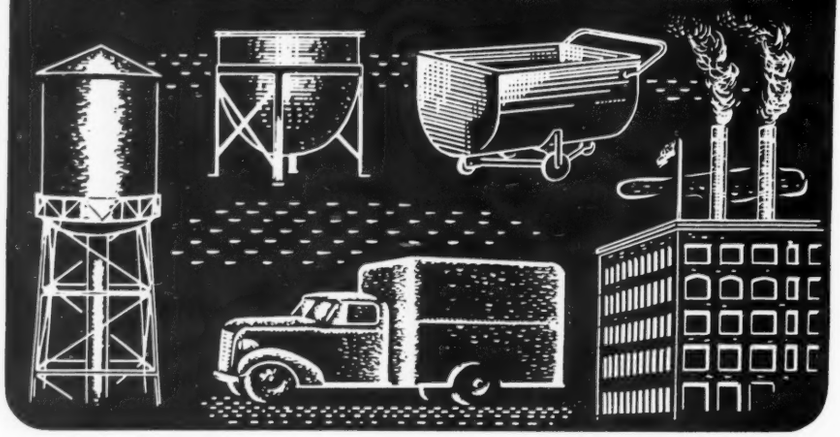
FOR INVESTIGATION of the changes involved in the ripening of wheat the process was studied in five stages: (1) milky; (2) yellow kernel; (3) ripe; (4) dead ripe; (5) post-ripening (storage).

The wheat kernel becomes poorer in protein, fat and crude fiber, but richer in starch, as ripening progresses. With variations in the quantitative relations, these statements are equally true for the three varieties of wheat included in the tests, one each from the types of wheat yielding low, medium and high baking quality flours.

An important feature of the post-ripening stage is liberation of free acids from the fatty oils by enzyme action. If these acids are allowed to reach a concentration higher than about one per cent, they interfere with gluten formation. The most active in this respect are oleic and linoleic acids. The numerous tests revealed, however, that there is an optimum concentration near or below one per cent at which the liberated fatty acids assist gluten formation instead of interfering.

Digest from "Ripening Process in Bread Cereals (Wheat)," by K. Schmorl, *Naturwissenschaften* 27, 834, 1939 (Published in Germany).

The Metallic Film of Protection



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FROZEN FOODS

Vitamin A in Frosted Peas

LITTLE or no carotene is lost in peas during vining, blanching, washing and other processes incidental to preparation for freezing. Ungraded peas are somewhat higher in carotene than those graded to No. 6, probably because more mature peas are present in the graded sample.

Storing either graded or ungraded peas at –40 deg. C. (–40 deg. F.) for 11 months does not reduce their carotene content appreciably. But if the storage temperature is raised to –17.8 deg. C. (0 deg. F.), the graded peas suffer a loss of 7 per cent and the ungraded peas lose 26 per cent of their original carotene content. These results are similar to the losses of vitamin C from frosted peas at –17.8 deg. C. (0 deg. F.).

The Russel, Taylor and Chichester modification of the chemical method for the determination of carotene suggested by Willstätter and Stoll gives satisfactory results with peas.

All the carotene extracted from peas appears to possess the same vitamin A potency as beta carotene.

Digest from "Carotene (Vitamin A) Content of Fresh and Frosted Peas," by C. R. Stimson and D. K. Tressler, *Food Research* 4, 475, 1939.

MEAT PRODUCTS

Thiamin Stability During Meat Processing

CERTAIN PROCESSING METHODS applying heat may reduce or destroy the antineuritic factor in meats and meat products which are an excellent source of thiamin or vitamin B_1.

Processing for two hours at 240 deg. F. decreased by 70 to 80 per cent the thiamin content in beef kidney, beef lung tissue and beef spleen. A meat product containing small amounts of grain retained less than one-fifth of its original vitamin potency when processed for about 2 hours at 240 deg. F.

Over half of the antineuritic activity was lost during the first hour.

Thiamin appears to be somewhat more sensitive to a rise in temperature than to an increase in processing time. According to the Medical Research Council, it is comparatively stable at 212 deg. F. (100 deg. C.) in an acid or slightly acid medium, while alkalinity reduces its potency appreciably, even at low temperatures.

Animal tissues remain good sources of the vitamin under carefully operated processing conditions. However, it is doubtful whether procedures in the plant can be modified sufficiently to prevent all loss of thiamin and still assure complete preservation of the product.

Digest from "Processing and Thiamin," by A. Arnold and C. A. Elvehjem, *Food Research* 4, 547, 1939.

Nitrite in Pickle Salts

WHEN DRY NITRITE PREPARATIONS for preserving meat are stored, the nitrite gradually decomposes. The losses fluctuate considerably, and the kind of paper used for bags apparently has no influence on the rate and amount of deterioration. In storage tests lasting four months, nitrite losses ranged from 8 to 46 per cent of the original nitrite content.

The cause of deterioration is not oxidation of nitrite to nitrate, but liberation of nitrogen oxides. If the pickle salt is exposed to air during storage, no nitrate is formed. But if the salt is stored without access to air, the liberated nitrogen oxides react with remaining nitrite to form nitrate.

A major cause of the nitrite loss is hydrochloric acid, which is liberated from magnesium chloride (a component of the pickle salt) and reacts with the nitrite, liberating nitrogen trioxide. Magnesium carbonate has been tried instead of magnesium chloride as a carrier for nitrite in pickle salt, but the keeping quality was poorer rather than better. It is suggested that magnesium chloride should be thoroughly investigated as a carrier for nitrite in pickle salts. It may contain impurities which favor the deterioration, or it may itself be responsible. Further research along this line is needed.

Digest from "Changes in Nitrite in Stored Meat Pickling Salts," by Georg Stamm, *Zeitschrift für Untersuchung der Lebensmittel* 78, 464, 1939 (Published in Germany).

OILS & FATS

Refining Fish Oils

A NEW combination process for refining fish oils is disclosed in Canadian Patent 384,364 (granted Oct. 3, 1939, to Wm. Hassard, Vancouver, British Columbia). Bleaching, deodorization and destearinization are effected in a raw or crude fish oil by treatment with an aqueous solution of potassium permanganate and magnesium hydrosilicate. Objectionable fatty acid compounds, such as stearic acids and its derivatives, are removed by emulsification in contact with the aqueous solution of reagents. The emulsion is readily clarified in a centrifuge, yielding clear oil and the separated emulsion phase containing the impurities.

The treated oil is pale in color and much improved in odor. The potassium permanganate causes a partial oxygenation which also improves the quality of the oil.

Nutritive Properties Of Animal and Vegetable Fats

THE COMPARATIVE nutritive properties of refined lard, hydrogenated lard,

FLASH!
2 TOUGH PROBLEMS
SOLVED for
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by ALVEY-FERGUSON ENGINEERS
DWINELL WRIGHT COMPANY
COFFEE AND TEA
BOSTON, MASS.
November 29,1939
The Alvey-Ferguson Company,
Oakley Station,
Cincinnati,
Ohio.
Gentlemen:
Last year, when we were building and equipping our new Coffee Roasting Plant, we had the problem of transferring roasted coffee from the coolers to the storing machines and we could not conveniently change either the location of the coolers or the storer hoot. We took this up with your organization who worked out a system of belt conveyors for us. This equipment was very inexpensive, it was simple to erect, and it has performed the operation for which it was intended perfectly. We are very pleased with it.
Recently, we wished to transfer cases of packed coffee from the end of the sealing machine to the spiral gravity chute, without the need of manual handling. So again asked your organization to study the problem, and you have furnished us with an inexpensive roller conveyor. This again has worked out very nicely to our entire satisfaction
Very truly yours,
DWINELL-WRIGHT COMPANY
President
SAM/AL
President of Dwinell-Wright Company (White House Coffee and Tea) Says, "Entirely Satisfied"!
YOU will notice in Mr. Mead's letter that the two problems of handling roasted coffee and cases of packed coffee were "worked out very nicely to our entire satisfaction and the equipment performed perfectly."
Many other successful companies, like Dwinell-Wright, National Distillers, Pepsodent, and Campana, are benefitting by "Scientifically Planned Conveyors." Your company can probably profit, too, by economical equipment designed to effect savings and increase efficiency. Without obligation, request our engineering advice today! The Alvey-Ferguson Co., 502 Disney Street, Cincinnati, Ohio.
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Conveyors

leaf lard, neutral lard, oleo oil, cottonseed oil, hydrogenated cottonseed oil and peanut oil were determined by growth and digestion experiments with young male albino rats. The results of this study are summarized in the following table showing the gain in weight of the animal and the digestive coefficient for each fat observed in tests of three diets of different fat content. There was no consistent relationship between the chemical composition of a fat or its melting point and the nutritive value of that fat. In a few cases, linoleic acid appeared to be a limiting factor.

Growth and Digestion Tests

Diet	No. 1	No. 2	No. 3
Fat, per cent of total weight of diet	5	30	55
Fat, per cent of total energy value of diet	12	53	78

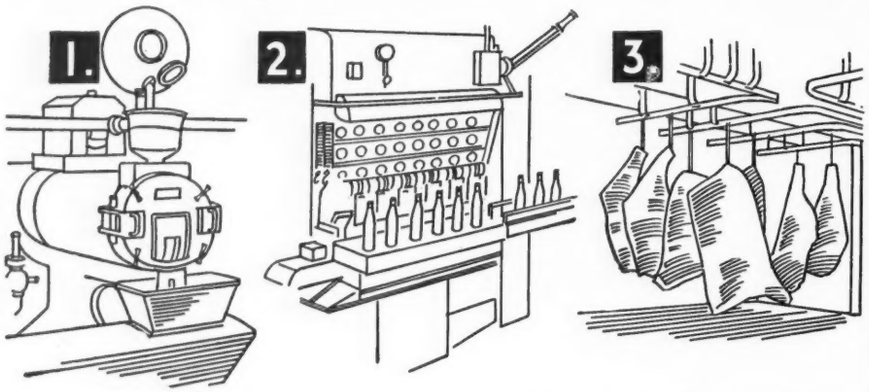
(See footnotes)	A (gr.)	B (%)	A (gr.)	B (%)	A (gr.)	B (%)
Cottonseed oil	8.91	96.6	7.29	97.2	*	*
Cottonseed oil, hydrogenated	8.71	88.2	7.28	92.2	7.29	93.7
Lard, hydrogenated	8.21	89.0	6.88	92.4	6.92	94.0
Lard, leaf	8.12	93.4	7.53	93.0	7.82	94.5
Lard, neutral	7.99	95.2	7.31	93.7	7.82	92.5
Lard, refined	8.81	97.6	7.85	96.5	7.87	95.5
Oleo oil	7.72	86.2	6.98	89.8	7.95	92.3
Peanut oil	8.58	93.1	7.48	95.7	*	*

A = Gain in weight per 100 calories consumed (grams).
B = Digestive coefficient (per cent).
* It was not possible to prepare uniform feed mixtures containing 55 per cent of these two oils.

Digest from "Nutritive Properties of Certain Animal and Vegetable Fats," by Ralph Hoagland and George G. Snider, Bureau of Animal Industry, Technical Bulletin No. 725, U. S. Dept. of Agriculture, January, 1940.

HTH PRODUCTS*

Cut Spoilage Losses, Protect Purity



1. To protect the quality and purity of ice cream, all containers and equipment—cans, freezers, pasteurizers, homogenizers, etc.—must be kept not only clean but germ-free. That is why HTH Products are used in so many successful ice cream plants.

2. The sanitation problem of the beverage bottler is two-fold. His products must meet rigid public health requirements and they must be free from molds, yeasts and other micro-organisms that cause spoilage—a job made-to-order for HTH Products.

3. Meat packers find HTH Products effective and dependable for sanitation in every part of the plant—edible rooms, killing floors, cookers, freezers, curing rooms, smoked-meat hanging rooms, cutting rooms, sausage manufacturing rooms, sliced-bacon coolers, etc.

Food and beverage plants cannot lose a single round in the constant battle against bacterial contamination without suffering substantial dollars-and-cents loss.

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HTH Products are dependable chlorine sterilizers in powder form—convenient to use, always full-strength, quickly effective in action. Added to water, they make germicidal hypochlorite solutions of the desired strengths for flushing or spraying all surfaces with which food or beverage products come in contact. And HTH Products are so economical, they can be used freely throughout the plant.

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PICKLING

Lactic Acid for Pickles—II.

IN PICKLE MANUFACTURE, the pH is not a reliable indicator for the preservative action of the acid. Although the pH for lactic acid is lower than for acetic acid at the same concentrations, lactic acid is not as good a preservative as acetic acid. When a combination of the two acids is used, the preservative power of the acid bath is directly proportional to the amount of acetic acid present, the lactic acid having little or no effect.

In the presence of sucrose, the individual reaction of these two acids is the same; in combination the preservative action is less than with acetic acid alone, but greater than with lactic acid. Increasing sucrose concentrations affect the viability of acid-resistant yeasts less when using lactic acid or a combination than with acetic acid alone.

Low sugar concentrations, likewise, are conducive to yeast growth, especially at low acid concentrations. Even acetic acid is not capable of preventing spoilage if the sugar concentration is below 14 deg. Baumé.

In order to assure satisfactory keeping quality, the sugar concentration should be above 14 deg. Be., preferably 22 deg. Be., and the acid concentration not less than 2 per cent of acetic acid or a combination of acetic and lactic acids.

Digest from "Preserving Value of Acetic and Lactic Acids in the Presence of Sucrose" by F. W. Fabian and C. K. Wadsworth, *Food Research*, 4, 511, 1939.

STARCH

Starch Paste Thinned By Ejector

IN PREPARING corn starch pastes, a water jet ejector can be used to good advantage for thinning a prepared thick paste. As the invention is described in British Patent 506,501 (granted June 29, 1939, to Philip D. Coppock and assigned to Distillers Co., Ltd., Edinburgh, Scotland), a thick paste is prepared by stirring 24 oz. of corn starch with 1 gal. of water at 190 deg. F. The finished paste is

obtained by forcing 18 gal. of the thick paste, with 40 gal. of water, through a water jet ejector into the final container.

SUGAR

Colored Sugar

COLORED SUGAR for sprinkling cakes and other food products is prepared from powdered sugar and a small proportion of invert sugar sirup. The method is disclosed in Holland Patent 45,847 (granted June 15, 1939, to Johannes J. A. Loomans, Breda, Holland). The invert sugar sirup is made by treating sucrose with aqueous hydrochloric acid at 167 deg. F. in an enameled kettle. Only 3 or 4 per cent of the sirup is needed to bring powdered sugar to the desired physical condition. The sugar is colored with odorless dyes and scented with alcohol-free aromatics.

VITAMINS

Vitamin E Sources

TWO FORMS of vitamin E are known, namely alpha-tocopherol and beta-tocopherol. Of many foods which have been tested by chemical and biological methods, wheat germ is richest in vitamin E. This is in keeping with the lipoid nature of the vitamin. The oil from wheat germ contains about 0.5 per cent vitamin E. In this respect wheat germ is about twice as rich as corn germ. Linseed oil ranks second, among the substances tested, in vitamin E content. Calculated on the dry matter, head lettuce contains even more than does wheat germ, but, as a food product, head lettuce holds only moderately high rank among sources of vitamin E. Olive, sesame and coconut oils are very poor sources as compared with wheat germ oil. Peanuts have a small but distinct vitamin potency, peas much less, bananas hardly any. Oils and fats are the natural solvents and vehicles for the tocopherols, hence the best sources of vitamin E.

Digest from "Vitamin E, Lipoid Outline, Biological Principle," by W. Halden, *Oesterreichische Chemiker-Zeitung* **42**, 81, 1939 (Published in Vienna).

MISCELLANEOUS

Mushroom Poisoning

A POISONOUS mushroom, *Entoloma lividum Quel,* closely resembles edible mushrooms in appearance and has been responsible for a number of poisonings. It differs from such edible mushrooms as *Amanita pantherina* and various strains of Russula, Lactarius and Boletus in the fact that it gives color reactions with several acid or alkaline reagents. Whereas the Entoloma mushroom gives no test with such common color-forming reagents as ferric chloride, ferric or ferrous sulphate, cupric sulphate, picric acid, aluminum sulphate or phenol, it does give color reactions with reagents as follows:

Concentrated sulphuric acid.....	Violet
Concentrated hydrochloric acid..	Faint pink
Concentrated nitric acid.....	Reddish violet
Sodium hydroxide (10% solution)	Lilac pink
Ammonium hydroxide (10% solution)	Lilac pink
Sodium carbonate (10% solution)—cold	No reaction
—boiling	Lilac

The colors formed by hydroxide or carbonate reagents are destroyed by adding acid to the solution. By these simple tests with common, inexpensive reagents, the poisonous Entoloma is easily differentiated from edible mushrooms.

Digest from *"Entoloma lividum Quel* as a Source of Mushroom Poisoning and Some Color Tests for Identifying This Fungus," by I. S. Roizman and P. E. Sosin, *Voprosy Pitaniya* **8**, 4, 81, 1939 (Published in Russia).

★ Cercon is an edible, tasteless wax suitable for coating food products requiring protection from the air.

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Formulas for Foods

FORMULA NO. 73

John Bull Sauce—I

Tamarinds	**50 lb.**
Apple pulp	**2 gal.**
Onions	**4 lb.**
Garlic	**12 oz.**
Sugar (brown)	**20 lb.**
Salt	**3 lb.**
Malt vinegar (24 grain)	**30 gal.**
Soy sauce	**6 gal.**
Ground ginger (Jamaica)	**4 lb.**
Chilies (Japanese)	**1½ lb.**
Lemons (chopped fine)	**10 lemons**

Working Directions

Place tamarinds and vinegar in steam jacketed kettle and gently simmer for 30 minutes. Pass through a pulping machine (8 mesh). Return to kettle and add the other ingredients. Stir well and boil gently for 5 minutes. Pass through fine mesh sieve. Bottle and cap at 180 deg. F. or higher.

Formula from H. B. Cronshaw, London, England

FORMULA NO. 74

Doughnut Icing Glacé

Granulated gelatin	**1 oz.**
Cold water	**1 lb.**

Soak. When expanded, add:

Boiling water (1 quart)	**2 lb.**

Dissolve by bringing to a thorough boil. Then put into a cake machine with:

Vanilla extract	**½ oz.**
Salt	**¼ oz.**
Butter	**2 oz.**
Corn sirup, unmixed (glucose)	**1 lb.**

Mix well and add:

Icing sugar (6X)	**10 lb.**

Mix thoroughly. Icing should be fairly soft. It is desirable to use while warm.

Variations of the Formula

It is possible to replace the corn sirup with standardized invert sugar, or to use 4 oz. of glycerine instead of the corn sirup or invert sugar.

Also, it is possible to replace the gelatin by ¼ oz. of powdered gum tragacanth, or by ⅛ oz. of powdered gum karaya.

Gelatin, standardized invert sugar or corn sirup may be omitted and replaced by 2 lb. of pectin jell, or by 2 lb. of icing stabilizer jell. Or, if it is desired, the water may be increased to 4 lb. and cooked with 1 oz. of tapioca flour or strong acid free corn starch with a very small amount of gelatin, stabilizer, agar-agar or vegetable gums added.

Using the cooked starch of tapioca permits making a glacé that is slightly less sweet.

Formula from Parker-Broeg, Boston

FORMULA NO. 75

Caramels for Casting

Unit	Ingredients	Test Batch	Production Batch
A	**Sugar (granulated)**	**1 lb.**	**20 lb.**
	Dry milk solids [3]	**5 oz.**	**9 lb.**
	Stabilizer [1]	**1 gram**	**1 oz.**
	Water	**10 oz.**	**15 lb.**
	Hard fat	**6 oz.**	**6¼ lb.**
B	**Corn sirup**	**1½ lb.**	**30 lb.**
C	**Salt**	**to taste**	
	Butter	**1½ oz.**	**1 lb.**
	Flavoring [2]	.....	.....

[1] Suggested stabilizers: Calcium Oxide, Sodium Nitrate, Sodium Carbonate, Ammonium Carbonate, Magnesium Oxide. The stabilizer is not really necessary, but, through its use, greater smoothness of the caramel can be attained. The amount to be used varies according to the acidity of the milk.

[2] Vanilla or other flavorings may be used and in quantity according to strength.

[3] Contain not more than 1½ per cent butter fat and not over 5 per cent moisture.

Method

Mix the sugar, dry milk solids, and the stabilizer. Gradually add the water to mixture, forming first a paste, then a semi-liquid. Set batch on fire or steam kettle, heat slowly, and gradually bring to boil. Add the hard fat.

When batch boils vigorously or at about 225 deg. F. add B and continue boiling. When batch reaches desired firmness add C.

As batch nears completion it is well to reduce heat.

FORMULA NO. 76

Liver Loaf

Hog livers	**50 lb.**
Veal trimmings	**20 lb.**
Regular pork trimmings	**30 lb.**
Dry milk solids	**12 lb.**
Salt	**2½ lb.**
White pepper	**6 oz.**
Marjoram	**1½ oz.**
Cardamom	**1 oz.**

Livers and meat must be cold as no ice is used in this loaf. Grind and chop until fine. Add dry milk and seasoning while chopping.

Place in containers that are lined with thin sheets of back fat or pork caul fat. After filling, put on lid and cook at 160 deg. F. for 2½–3 hours, depending on size of containers. After cooking, chill.

Formula from Dry Milk Institute

FORMULA NO. 77

Wine Cake
(90 per cent sugar-flour ratio)

Ingredients	Batch Weight 100 oz.	Batch Weight 100 lb.
Sugar (fruit powdered)	**24 oz.**	**24 lb.**
Butter	**4 oz.**	**4 lb.**
Hydrogenated shortening	**8 oz.**	**8 lb.**
Salt	**½ oz.**	**8 oz.**

Blend on low speed for 2 minutes, then set machine on second speed and cream for 6 minutes.

Eggs	**13½ oz.**	**13 lb. 8 oz.**
Top quality special cake flour	**10 oz.**	**10 lb.**

Set machine on low speed, and mix for 5 minutes.

Fluid milk	**15½ oz.**	**15 lb. 8 oz.**
Vanilla extract.	**½ oz.**	**8 oz.**
Orange extract.	**¼ oz.**	**4 oz.**

Work in with very little mixing.

Top quality special cake flour	**20 oz.**	**20 lb.**
Baking powder.	**¾ oz.**	**12 oz.**
Sugar (4X)	**3 oz.**	**3 lb.**

Sift flour, baking powder and sugar, add to preceding batch and mix

*1923 PRESIDENT COOLIDGE IS INAUGURATED

*1923 *In 1923 Chas. Pfizer & Co., Inaugurated the First Commercial Production of Citric Acid from Native Raw Materials*

¶ Until 1923, citric acid was produced in this country from citrate of lime, which had to be imported from countries growing citrus fruits in quantity. It had long seemed to Chas. Pfizer & Co. definitely unfortunate that a constituent of so many domestic foods, soft drinks and medicinal products, should have to be produced from crude material controlled by a foreign monoply.

¶ After more than twenty years of painstaking research, Chas. Pfizer & Co. perfected in 1923, a new process for commercial production of citric acid from sugar.

¶ The large-scale production of citric acid made possible by the Pfizer process resulted in higher purity, lower prices and expanding markets. New markets of promise for citric acid today include the plastics, plasters, adhesives, lacquers, inks, varnishes, and many more.

¶ This is only one of many notable achievements in the ninety year history of Chas. Pfizer & Co. that have made this firm's name known and respected throughout the world.

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PURITY

slowly but thoroughly (about 3 minutes).

Batch temperature, 65 to 75 deg. F.

Oven temperature, small or shelf type oven, 340 to 360 deg. F. for deep pan; for large, loaded oven, allow for drop after loading.

Formula from "Bakers' Cake Better Than The Housewife Can Bake!" (Copyrighted by Brown's Hungarian Corp., New York, by special permission.)

FORMULA NO. 78

Root Beer Sirup (Imitation)

Emulsify by beating:

Oil of sassafras	**20 oz.**
Methyl salicylate	**9 oz.**
Oil of cassia	**1¼ oz.**
Tincture of gentian	**8 oz.**
Gum arabic	**30 oz.**
Water	**60 oz.**
Sugar (sucrose)	**340 lb.**
Sugar color (caramel)	**3½ gal.**
Vanillin (in 1 pint of hot water)	**5 grams**
Water	**19½ gal.**

Working directions

Dissolve the sugar in the water. Add the other ingredients. Heat to 180 deg. F. After solution is complete, cool to less than 100 deg. F. Homogenize at a pressure of 3,000 lb. per square inch. (If a homogenizer or viscolizer is not available, it is possible to obtain fair results by beating it cool.)

Formula from David Algie

FORMULA NO. 79

Canned Cherry Cocktail

	Per Cent
Montmorency cherry juice:	
Hot pressed juice	**28.1**
Cold pressed, pectinal-clarified juice	**9.4**
English Morello cherry juice:	
Hot pressed juice	**3.1**
Cold pressed, pectinal-clarified juice	**9.4**
Sucrose sirup (15 per cent)	**50**
	100.0

Directions

Prepare the four types of juices according to procedures given in Circular No. 180 issued by the New York State Agricultural Experiment Station.

Blend, strain, deaerate, flash pasteurize, fill hot into No. 2 tall (20-oz.) cans lined with "berry" enamel, close and lay on side for 3 minutes. Cool in cold water.

Formula from D. K. Tressler and C. S. Pederson, New York State Agricultural Experiment Station, Geneva, N. Y.

Books

Properties of Pectins

FRUIT PECTINS — Their Chemical Behaviour and Jellying Properties. By C. L. Hinton. Published by Chemical Publishing Co., Inc., 148 Lafayette St., New York, N. Y. 1940. 96 pages; 5¾x8¾ in.; cloth. Price, $1.75.

This is a scientific report based on work done over a period of several years by members of the staff of the British Association of Research for the Cocoa, Chocolate and Sugar Confectionery and Jam Trades. It presents a study of the variations in the chemical properties of pectins as extracted from fruits as a basis for an eventual explanation of their jelly forming behavior. It is a type of book useful to food chemists and technologists. It has 42 tables and thirteen curves on the behavior and properties of pectins interspersed with the text.

How to Use Stainless Steel

FABRICATION OF U.S.S. STAINLESS STEELS. Published by Carnegie-Illinois Steel Corp., Pittsburgh, Pa. 1939. 92 pages; 6x9 in.; cloth. Price, $1.00.

Both the practical and technical aspects of stainless steel fabrication are discussed in detail. Part I is devoted to welding, riveting, soldering and joint design. Part II takes up machining, cutting, forming, annealing and pickling operations. Part III discusses surface finishing and protection. Of particular interest to the food industries is a table of laboratory corrosion data showing the resistance of U. S. S. stainless steels to various chemicals and acids.

Federal Regulations Code

THE CODE OF FEDERAL REGULATIONS OF THE UNITED STATES OF AMERICA HAVING GENERAL APPLICABILITY AND LEGAL EFFECT IN FORCE JUNE 1, 1938, FIRST EDITION. Published by Superintendent of Documents, Government Printing Office, Washington, D. C. Price, $2.25.

To assemble the many thousands of Federal regulations in most usable form, a series of volumes is being planned, codifying all Federal regulations which were in force June 1, 1938. Five volumes are now available: Volume 2 of this series is the code of those items which appear in the *Federal Register* under Title 7—Agriculture. Volume 5 includes four titles, Nos. 18 through 21, inclusive;

Announcing

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title 21 assembles the regulations of the Food & Drug Administration.

Presumably, annual supplements will be issued to keep these volumes up to date. It should be noticed that the Food and Drug volume contains only those regulations which were in effect June 1, 1938, and therefore prior to the Federal Food, Drug and Cosmetic Act of 1938 (June 25).

Shipping Department Hints

IMPROVED METHODS IN PACKING AND SHIPPING. By Clifton H. Cox, C. D. Hudson, R. L. Beach, T. L. Lussen, Paul C. La Pierre and Don L. Quinn. Published by American Management Association, 330 West 42d St., New York, N. Y., 1939. Production Series No. 115. 40 pages; 6 x 9 in.; paper. Price, 75 cents.

Practical production information of the type that operating men can get their teeth into is presented by the six authors in abbreviated form. There are ideas on simplifying work in the shipping department, on reducing packaging costs and on the advantages and disadvantages of packing material specifications. Then there is information on recent developments in wooden shipping containers, on progress in packing for shipping and on new container testing devices.

Analyses of Food Products

ACCEPTED FOODS AND THEIR NUTRITIONAL SIGNIFICANCE. Published by Council on Foods of The American Medical Association, 535 N. Dearborn St., Chicago, Ill., 1939. 492 pages; 5¾x8¾ in.; cloth. Price, $2.

This book gives analyses submitted by individual manufacturers of food products accepted by the Council on Foods of the American Medical Association. The volume includes a section on the operation of the Council, detailed information for manufacturers wishing to submit products, data on nutritional and dietary aspects of foods and a general index. It offers a concise guide to food manufacturers wishing to qualify for the Council's Seal of Approval and a critique on food advertising claims important to food advertising men. Food technologists and home economists interested in the nutritional and chemical composition of foods will find the book of practical value.

Symposium on Nutrition

FOOD AND LIFE—YEARBOOK OF AGRICULTURE 1939. Published by the Department of Agriculture, Washington, D. C. 1165 pages; 6x9 in.; cloth. Price, $1.50.

Food executives concerned with the problems of nutrition will find this volume an admirable composite of present knowledge. It departs radically from the old-fashioned Agricultural Yearbook. Instead of reporting on work of the Department itself, outstanding nutrition experts have taken various phases of this broad subject for critical analyses, and they present excellent summaries of present knowledge based on work from all parts of the United States and abroad. This is written in readable style, giving a clear understanding of the significance of vitamins, protein requirements, mineral constituents of food, food habits and the fundamentals of nutrition.

The second half of the volume is devoted to animal nutrition.

Patents

Mold Growth in Food Inhibited by Addition of from 0.01 to 2.3 Per Cent by Weight of a 3- to 12-carbon Atom, Saturated Aliphatic Monocarboxylic Acid Salt and from 0.001 to 0.3 Per Cent by Weight of Ammonium Bicarbonate—Charles Hoffman, Searsdale, Gaston Dalby, New York, and Thomas R. Schweitzer, South Ozone Park, N. Y., to Ward Baking Co., New York, N. Y. No. 2,190,714. Feb. 20, 1940.

Asparagus Tips and Similar Elongated Tapered Articles Mechanically Packed into Cans to Give a Uniform Top and Bottom Fill—William de Back, to Chisholm-Ryder Co., Inc., Niagara Falls, N. Y. No. 2,190,936. Feb. 20, 1940.

Whole-Grain Cereals Subjected to Heat and Gas Pressure in Presence of a Salt and Suddenly Exploded by Release of Gas Pressure—William J. Plews, Chicago, Ill., to Plews Processes, Inc. No. 2,190,949. Feb. 20, 1940.

Citrus Fruit Juices Concentrated and Sterilized Without Destruction of the Color-bearing Cells—Gotthold Harry Meinzer, Glendale, Calif., to California Consumers Corp., Los Angeles, Calif. No. 2,190,991. Feb. 20, 1940.

Gelatin and Casein Freed from Calcium, Magnesium and Iron Impurities by Treatment with an Alkali-metal Metaphosphate—Charles Schwartz, to Hall Laboratories, Inc., Pittsburgh, Pa. No. 2,191,206. Feb. 20, 1940.

Egg Whites Acidified to a pH Between 5.5 and 5.8 for Separation of Flocculent Precipitate and Drying Before Fermentation Occurs to Give Product Free of Decomposition Odors—Verne D. Littlefield, Beverly Hills, Calif., to Armour & Co., Chicago, Ill. No. 2,191,257. Feb. 20, 1940.

Animal Meat Tissue Treated with an Alkaline Saponifying Agent from Alkaline Earth Metal Oxides, and Hydroxides, and Extracting with an Organic Solvent for Recovery of Cholesterol—Jules D. Porsche and Fred J. Solms, to Armour & Co., Chicago, Ill. No. 2,191,260. Feb. 20, 1940.

Doughnuts Deposited into Cooking Vat and Turned Over by Paddle Device Mechanically Operated—James J. Morris, to Theodore J. Morris, Chicago, Ill. Nos. 2,191,284, 2,191,285, and 2,191,286. Feb. 20, 1940.

Ice Cream, Fluid Custards and the Like Frozen in a Continuous Manner—Charles Erickson and Erick Spellman, New York, N. Y. No. 2,191,344. Feb. 20, 1940.

Sugar Solutions Purified by Treatment with a Resin Derived From Catechol-Tannin When Treated with Concentrated Sulphuric Acid and Formaldehyde—Robert Boyd, Vancouver, British Columbia, Canada. No. 2,191,365. Feb. 20, 1940.

Starch-protein Thickening Agent Made to Have More Than Twice the Water Absorption Capacity of Ordinary Unmodified Starch—James F. Walsh, Chicago, Ill., and Archie L. Rawlins, Hammond, Ind., to American Maize-Products Co. No. 2,191,509. Feb. 27, 1940.

Fresh Fruits Treated with Trimethyl Borate Vapors to Inhibit Deterioration—Willard E. Baier, Ontario, Calif., to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,191,553. Feb. 27, 1940.

Frozen Lean Meat Cut into Paper-thin Slices—Joseph P. Spang, Quincy, Mass., to Cube Steak Machine Co., Inc., Boston, Mass. No. 2,191,732. Feb. 27, 1940.

Hop Extract Made by Use of Organic Solvents in an Atmosphere of Carbon Dioxide—Louis Anton Freiherr von Horst, Coburg, Thuringia, Germany. No. 2,191,838. Feb. 27, 1940.

Fruits and Vegetables Sliced and Sprayed with Heated Sweetening and Seasoning Agents Preparatory to Drying and Granulating—Olga Headland, Moorhead, Minn. No. 2,192,041. Feb. 27, 1940.

Wheat Flour Bleached and Given Improved Baking Properties by Addition of a Powdered Active Organic Peroxide and a Powdered Nitrogen Acid Salt in Dry Form—Frederick H. Penn, Dallas, Tex. Nos. 2,192,099, and 2,192,100. Feb. 27, 1940.

Canned Foods Heat-treated in a Continuous Manner While Passing Through a Chamber Equipped with a Flexible Endless Conveyor Installed to Provide a Series of Serpentine Paths Through the Chamber—William de Back, Niagara Falls, N. Y., to Chisholm-Ryder Co., Inc., Niagara Falls, N. Y. No. 2,192,181. March 5, 1940.

Soybean Protein Converted into Artificial Fiber by Method Involving Use of Added Lecithin—Toshiji Kajita and Ryohei Inoue, Tokyo, Japan, to Showa Sangyo Kabushiki Kaisha, Yokohama, Japan. No. 2,192,194. March 5, 1940.

Whole-kernel Corn Products Made Free from Corn Oil, Hulls, Germ and Cap Fiber—Theodore B. Wagner, Brooklyn, N. Y. No. 2,192,212. March 5, 1940.

Starch Conversion Products Made to Have Non-bitter Taste—James F. Walsh, Chicago, Ill., and Siegfried M. Kinzinger and Abraham H. Goodman, Hammond, Ind., to American Maize-Products Co. No. 2,192,213. March 5, 1940.

Fresh Bananas Kneaded While in Skin to Permit Removal of the Skin and Controlled Drying Until Fruit Reaches a Stabilized, Soft, Tender State for Packing—Henri Daniel Rey, Papeete, Tahiti, to The Anglo California National Bank of San Francisco, San Francisco, Calif. No. 2,192,273. March 5, 1940.

Corn Sirup Mixed with Corn Steep Water and Slop from Corn Starch Manufacture Preliminary to Passage Through Heated Rolls to Gelatinize Starch and Increase Water Absorption Capacity for Use as Cattle Feed—Albert H. Kelling, Oak Park, Ill., to Corn Products Refining Co. New York, N. Y., No. 2,192,611. March 5, 1940.

Fish Freed from Heads and Tails by Mechanical Means During Travel Along on Endless Carrier in Pockets Past a Vacuum Producing Orifice for Gutting—Henry R. McGrew, Monterey, Calif. No. 2,192,838. March 5, 1940.

Animal Casings Dried by Warm, Dry Air Applied Internally Through a Mandrel and Externally as Casing is Withdrawn From Mandrel—Lloyd E. Dimond, Chicago, Ill., to Wilson & Co. No. 2,192,898. March 12, 1940.

High-conversion Corn Sirup With a Reducing-sugar Content of From 27 to 32 Per Cent Dried to a Non-hygroscopic State—Ottomar Wolff, Berlin, Germany, to American Maize-Products Co. No. 2,192,951. March 12, 1940.

High-conversion Corn Sirup Containing From 32 to 54 Per Cent Reducing Sugars on a Total Solid Basis Dried to a Non-hygroscopic State—Ottomar Wolff, Berlin, Germany, to American Maize-Products Co. No. 2,192,952. March 12, 1940.